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Building-Stones of the Lincolnshire Oolite.

THE formation known to geologists as the Lincolnshire Oolite has for ages been celebrated for its building-stone: it is believed to have been worked as far back as Roman times in some districts. At the village of Barnack, for example, a statue of recognised Roman workmanship has been discovered carved out of the well-known "rag;" whilst in the parish church the Saxon, Norman, Early English, and Decorated portions are built of the same material; and certain it is that in Mediæval times it was very extensively worked and carried by water to many parts of Lincolnshire and the fen country. This Oolite was also employed in the erection of some of the finest examples of Elizabethan architecture in the counties of Northampton, Lincoln, and Rutland, and in this connexion is widely known to the profession. But very few of the quarries at present open can satisfactorily trace their origin to these early times. Old workings have been abandoned and new ones have sprung into existence, not far removed it may be from their predecessors, but, still, far enough to result in some slight change in the lithological character or structure of the stone, either for the better or worse. These facts should be borne in mind when examining the present condition of the stone in these ancient buildings, and applying the results to the material as now quarried. The building-stones of the Lincolnshire Oolite as a whole have always been noted for their durability, and this, together with the favourable account of them given in the Report of the Royal Commission in 1839, has largely increased the industry. Even since the appearance of that useful Parliamentary paper, however, certain of the most important quarries now in operation have been opened up, whilst others are either but comparatively little worked, or are altogether closed,—some of the newer stones are not of such good quality as those formerly obtained near the same spots, whilst others exhibit a marked improvement in that respect. The introduction of railways and increased facilities of carriage, with the consequent reduction in prices, have also played their *rôle* in bringing about these changes. It may be well, therefore, to briefly review the principal stones at present sent to the market, and to give some account of the industry.

The Lincolnshire Oolite is best developed in the county from which it derives its name, but it extends northwards into Yorkshire, southwards into north Northamptonshire, and is well represented in Rutland. At Stamford it is about 80 ft. in thickness, and northwards from that town acquires still greater proportions. Its horizontal extent is, however, by no means commensurate with this thickness, for Professor Judd, F.R.S., has shown that it thins away rapidly southwards, eastwards, and northwards. That excellent authority considers it to be the eastern portion of a great lenticular mass of marine limestones intercalated between the Upper and Lower Estuarine series, which beds are respectively found above and below it in most districts. Its geological age, which, as a rule, is wrongly quoted in non-geological works, is referred to the Inferior Oolite period, being on the same horizon as the quarries in Gloucestershire at Painswick Hill, Guiting, Brockhampton, Broadway, Cleeve Cloud in the Cotteswold Hills, &c. We may here pause to allude to a popular error in regard to the words "Inferior Oolite"; we find that in the trade they are generally understood to imply that as a rule the stones comprised within that formation are of inferior quality; but this is by no means the case, and it is to be regretted that such an erroneous construction should be placed on a common geological term, which is merely used to indicate the relative infra-position, stratigraphically, of that stone in the Oolitic series. For example, it is inferior in position to the Great or Bath Oolite—it occurs beneath it stratigraphically.

The Lincolnshire Oolite limestone exhibits many distinct facies, even in short distances, and this, perhaps, forms its most peculiar feature when contrasted with the comparatively regular, homogeneous Bath and Portland beds in the south and west of England. The quarries of any one district in the Great Oolite, for instance, are, as a rule, very similar to each other, the succession of the beds is practically the same in all of them, with but slight variations in thickness; the jointing is tolerably persistent over large areas, and the beds of stone are fairly even, whilst soft or rotten stone and clay galls are not of very frequent occurrence. But the character of the Lincolnshire Oolite is entirely different, and the rules adopted in quarrying the one class of material do not (with rare exceptions) apply to the other, the north country stone being much the more difficult to deal with, as will presently be seen. There are at least four distinct facies comprised within it. The first is characterised by the occurrence of slightly argillaceous limestone in thin hard and soft beds, much cut up by small joints. It is ordinarily sub-crystalline, very slightly Oolitic in structure, and is full of fossils. In a pit at Castle Bytham the rock is seen to be almost wholly made of fossil corals. This bed only furnishes local building-material.

In a second facies we find the strata converted into a fissile limestone, which at Collyweston, Kirby, and near Dene produces roofing-slates. They are, of course, not the usual kind of slates, which are composed of silicate of alumina, thin, and of bluish-purple tints; but are, as might be imagined, of carbonate of lime, thick, and of varying yellow and grey tints. This material, so highly esteemed in the Middle Ages, has continued to be worked down to our own times, though on a much smaller scale than formerly. With increased railway accommodation, and the consequent introduction of the lighter and more economical Welsh slates, the "Collyweston slate" industry rapidly declined. The neutral tint of this Oolitic slate, however, harmonises perfectly with the stone of the same colour and nature used in many old ecclesiastical edifices, and the late Sir Gilbert Scott, amongst others, continued to employ it in more modern churches. A short time ago, when in the district, we were informed that its present use is almost entirely confined to the renovation of old roofs and in supplying local wants. The immense areas occupied by many of these old slate-pits abundantly testify to the great demand for the material originally; their refuse-heaps are quite conspicuous features in the landscape. Although a great portion of the beds surrounding it is fissile, the stratum from whence the true roof-

ing slate comes is comparatively thin, varying from 6 in. to 3 ft. in thickness. It is quarried either in the open or by drifts, which run a long way underground, and the stone is removed by means of picks and wedges. Curiously enough, the slates cannot be cleaved from the blocks of stone until the latter have been frosted. Professor Judd, in speaking of this, says * that they are usually dug during about six or eight weeks in December and January. The blocks are laid out on the grass, preferably in a horizontal position. It is necessary that the quarry-water shall not evaporate before the blocks are frosted, and they are constantly kept watered, if necessary, until as late as March. The weather most favourable to the production of the slates is a rapid succession of sharp frosts and thaws. If the blocks are once allowed to become dry they lose their fissile qualities, and are said to be "stocked." They can be cleaved at any time after being frosted.

A third facies of the Lincolnshire Oolite formation consists of strata very largely made up of broken or comminuted shells, amongst which numerous Oolitic granules are regularly dispersed, which pass by insensible gradations into the fourth kind, which is a true Oolite, made almost entirely of the characteristic spherules. The principal building-stones are raised from the two last-mentioned beds; for brevity, the former kind may be styled the "shelly Oolite," and the latter "true Oolite."

These different kinds of material do not follow one another in a regular order of succession throughout the formation, as in many other stone-producing districts. Locally, a few general rules may be established; but when traced over a large area, the divisions are frequently found to replace each other, the type of rock occurring at the top of the series in one district being found at the bottom of it in another. At first sight, these remarks may appear to have but little economical bearing, except from the quarryman's point of view; but this is not so; it is of considerable importance to the architect also in enabling him to make out his specification properly. We know of cases where stone of a particular horizon has been specified; but, as we see, it is not always possible to describe the building-stone raised at various places in the Lincolnshire Oolite limestone as coming from a particular horizon in it. Where several quarries are worked by one firm, specifications giving "precise horizons," however well entertained at first, are of necessity entirely ignored in practice as the order is being "made up." The following is not a bad way of dealing with such cases. When the quarry-owner indicates that he has three qualities of stone for sale at three different prices, he should be asked to submit a fair average sample of *each*,—not of one kind only,—with prices attached, respectively. One foot cube is a convenient size,—small pieces which can be put into the waistcoat-pocket are of little value for practical purposes. If the architect selects the best quality, with the highest price (depending on the nature of the work for which it is intended), the fact should be very clearly set forth in the specification, and the quarry-owner, after entering into the contract, should be well kept to the bargain throughout. It should not be permissible when the architect has ordered one class of stone from a quarry for the builder to step in and order another kind, under any pretext whatever; to some this remark may appear unnecessary, but we make it advisedly. In the event of a dispute as to the quality of the stone arising between the architect and the quarry-owner, in a large contract the matter might be submitted to an arbitrator, who shall compare the samples submitted in the first instance with the material actually supplied on the works, and be guided in his judgment accordingly. We remember having been once drawn into the vortex of a dispute of this nature, and found that the matter could not be very amicably adjusted, for the simple reason that neither party could agree as to what was originally specified, and there was nothing very definite to appeal to. Where Oolites, like those of Bath and Portland, are regularly jointed and bedded, and each bed has a definite and well-known name of recognised value, the above remarks are not so applicable, neither do they refer to certain quarries in the Lincolnshire Oolite, where, locally, the character of the stone and jointing, as at Ancaster, are more even than is usually the case with that formation.

* "Geology of Rutland," &c. (Mem. Geol. Survey), 1875, pp. 182-3.

The principal stone-quarries in the series now under review are at Ancaster, near Sleaford; Ketton, Little Casterton, Clipsham, Barnack, and other places near Stamford, and at Weldon, near Kettering.

The Ancaster quarries are about a mile from the village of the same name, and two from its railway station, where there is a depôt, to which the stone is carted in waggons. Quarries have been worked in the district for centuries, and there is every reason to believe that at some early date water carriage existed from Boston, for many of the churches on the east coast, as far south as Harwich harbour, contain considerable quantities of stone which is quite indistinguishable from that of Ancaster. The lofty tower and spire of Grantham church (thirteenth century), Belvoir Castle, and Belton House, Grantham; and Wollaton Hall, near Nottingham (seventeenth century) are excellent illustrations of its use in olden times, whilst the work recently carried out at St. Alban's Abbey (we will not say "restoration"), Midland Hotel and Station at St. Pancras, restoration of chapel and blocks of new buildings, Lincoln's-Inn; and Hatchett's Hotel, Piccadilly, may be cited as modern examples of its employment. In the Lindley quarries, which may be taken as a typical development of the beds, we found the section as follows:—

	Thickness.
Stiff black clay, elsewhere used for brickmaking	12 ft. to 22 ft.
Rag or "Weather Bed," light brown colour, hard and very compact,—at present very largely raised as building-stone ...	3 ft. to 8 ft.
"Freestone," light cream colour; tools easily. Finest beds near the bottom; mostly used for building purposes	14 ft. to 23 ft.

The measurements given are derived from an examination of the different quarries, which, however, are quite close to each other. They are total thicknesses, each division consisting of several courses separated by joints. It might be taken as a rule that the freestone in the district can be obtained in blocks from 1 ft. 6 in. to nearly 3 ft. in thickness, depending on the quarry, whilst any reasonable length and breadth can be had. We are informed that the labour in tooling is about 5 per cent. higher than that of ordinary Bath Oolite. The stone will be described in greater detail and compared with others later on. The rag or weather bed is very much stronger than the freestone, and matches the old Barnack rag, for which reason it is much used in the restoration of buildings originally constructed with the latter material. It can be obtained in any length and width, and up to 2 ft. in thickness. Certain portions of this stratum, which are light-blue in colour, are occasionally sawn into 2-in. slabs for flooring, for which purpose it is very effective. The bedding of the stones in the quarries is practically horizontal. All are open workings, the blocks being removed by picks, wedges, and bars, and in the Lindley quarries are lifted to the surface by a steam-crane and travellers. Here also there is a steam planing-machine. The stone is sawn both dry and wet. The number of men employed varies considerably with the time of year, but there are about sixty men, mostly on piece-work, in the two sets of quarries in the district.

There are also extensive workings at Haydor, near Ancaster, which produce an excellent stone. It does not differ materially from that already described, and is taken to the railway depôt by a traction-engine. We believe that about twenty men are engaged in the work.

The Ketton quarries, which are about two miles from the station, are also of high antiquity, though the earlier workings were abandoned years ago. The stone has been used in nearly all the large mansions in its immediate neighbourhood—also at St. Dunstan's Church, Fleet-street; Peterborough and Ely Cathedrals, &c. The beds are subject to considerable variability in thickness in the different workings, but the following section (with slight alterations) is given by Professor Judd:—

	Thickness.
Dark Upper Estuarine clays of great thickness, with ironstone nodules at base.	
The "Crash" bed—a coarse, shelly Oolite, of purplish-red colour, of different shades, used for walling and rough building purposes, about.....	3 ft.
Grits and Rag, of light grey tint, highly crystalline in texture, too hard to be dressed, in two beds, about.....	6 ft.
Freestone, of cream colour, true Oolitic structure, bedding planes hardly visible. This is the best building-stone	3 ft. to 3 ft. 6 in.

When the "crash" bed is first dug into, it is very soft; but, on exposure to the atmosphere, acquires extreme hardness. The freestone can be placed indifferently in any position in buildings without exhibiting increased tendency to weathering. The workable bed forms sometimes one, and at other times two, courses. The strata dip slightly. It is a pity that the amount of overburden is so enormous, and, in consequence, the cost of quarrying so great, that the material cannot be more readily obtained; for, as everybody admits, it is unquestionably one of the best and most uniform building-stones in the kingdom. It is not weathered or seasoned at the quarries, and is not difficult to tool, but we were informed that large blocks are not now easily obtained; the Commissioners' Report referred to, however, states that the size of the blocks that can be procured is said to reach 100 ft. No steam-power is at present used in any of the quarries, the stone being moved by ordinary hand-cranes. From fifty to sixty men are, on an average, engaged in the industry; but, in times gone by, as many as 100 men were employed.

In one of the Ketton quarries we saw an ingenious patented contrivance (Turner, No. 685, January 14, 1889), being an improvement in stone-working machinery. It aims at facilitating the more accurate turning of stone balusters, urns, &c., and, briefly, consists in a horizontal bar fixed about 2 ft. above and along the length of the lathe, with sliding and partially revolving "adjusters" attached thereto. The mason, putting the working drawing in position under the horizontal bar, slides the adjusters along it until they are over the more prominent and cut-in portions of the design, and then fastens them. The partially revolving portion of each adjuster (which is weighted and works independently of the part just secured) carries a sliding wire, and this wire is now adjusted to the pattern of the working drawing, and then fixed in the revolver. When this process is finished the mason allows each revolver to turn half round, carrying its wire out of the way, keeping clear of the work, which it does by means of the weights (shots) referred to. Now putting the rough stone in the lathe, he turns it partially into the required shape, but as the work approaches completion he frequently brings the wires down on to the stone until they freely revolve and pass over it. It will be seen that by this method great accuracy of proportion is attainable, for until sufficient of the stone is turned off, the wires of the revolvers will not pass by,—they should just be able to run clear. This invention unquestionably saves a considerable amount of time in turning, and avoids the unsatisfactory process of continually measuring with the rule or otherwise as the work is in progress.

The Weldon stone and quarries have already been described in our columns, but a recent

visit enables us to make a few additional observations, and a brief *résumé* of the whole will serve to render our present remarks more complete. The Weldon quarries are about a mile and a half from the Weldon and Corby station. Quarries in this district also have been worked since a very remote period, though it is only within the past few years that the present extensive operations have been opened out, and the material sent to all parts of the kingdom. The stone has been used in Kirby Hall (sixteenth century); also in the new University Library, Cambridge; Lincoln and Rochester Cathedrals; the Parish Church, Local Board Hospital, Liberal Club, and other edifices in Kettering; Board School, Rothwell; the Manor House, Brigstock, &c. We measured the following section at No. 2 quarry:—

	Thickness. ft.	in.
Boulder clay	4	0
Irregular fissile stone and sandy beds, known as "Weldon Freestone grit" ...	2	0
Rag and rough, brown-coloured freestone in alternating beds, with a strong course of ragstone at base	13	6
Freestone, shelly, cream-coloured, compact, and laminated. This is the best building-stone in the quarries	7	6

The ragstone, as in other quarries, was used in Mediæval times in the manufacture of marble chimney-pieces, &c.,—an industry now quite extinct. The freestone, which belongs to the "shelly Oolite" facies, is, by comparison with other Lincolnshire Oolite limestones, chiefly remarkable in regard to its thickness, the courses being such that blocks of any practicable size are ordinarily obtained, which, as a rule, are sound and very durable. They are not seasoned before being sent away. The jointing is rather irregular, causing the beds to be lenticularly disposed, which occasions some trouble in working; but this is more than counteracted by the facility with which the freestone can be driven into and mined. The Weldon are the only quarries in the Lincolnshire Oolite in which, so far as we are aware, the stone is obtained by mining, as at Bath, &c., and it is a distinct advantage, relieving the necessity of removing the great quantity of overburden. The rag (18 in. thick) at the base of the rough freestone forms a good ceiling. The beds dip slightly. No steam-power is used except for sawing; about sixty men are constantly employed, mostly on piece-work. The stone is at present carted to the station; but it is hoped that, with the rapidly-increasing business, a railway siding will be constructed,—indeed, a mineral railway along the valley, serving both the iron and stone industries, seems to be very urgently needed.

The Barnack quarries are more interesting historically than for the stone at present raised. We have already alluded to some instances of the use of the material, but we may add Burleigh House, Croyland Abbey, and Boston, Spalding, Holbeach, and Moulton churches. The following may be cited as the typical development in the pits:—

Rubble Oolite.	*Thickness.*
Oolite mainly composed of small shells and scattered spherules, about.....	4 ft.
White, true Oolitic limestone, with sandy beds at base	8 ft.

Professor Judd, speaking of the celebrated Barnack rag of early times, says*:—"Before the Perpendicular period (fifteenth century) the use of the stone appears to have been abandoned, probably from the exhaustion of the quarries. . . . . Several pits in the Lincolnshire Oolite are still worked near Barnack, but in none of them is a rock of exceptionally fine quality found; and the general opinion that the Barnack rag . . . . is now wholly exhausted is probably the correct one." The old quarries in the vicinity are very extensive.

Many openings exist near Stamford, which, in the aggregate, produce a considerable quantity of stone, and in this connexion we may notice the quarries at Little Casterton, where the light brown and grey tinted freestones are of good quality, and readily find their way to the London market, though the workings at present are not on a very large scale. This district is capable of being much more extensively developed.

At Clipsham the freestone is quarried from beneath a considerable thickness of clays. It is a durable material, not unlike the Ketton in appearance, but less even in grain, and with a few shells scattered through its mass.

We may now institute some comparisons between the different stones mentioned, with special reference to their structure and physical properties. We have seen that the stones sent to the market are broadly of three kinds,—viz., Ragstone, Shelly Oolite, and True Oolite.

The "Ragstone" is present in nearly all the quarries mentioned, and is mainly composed of fossil shells of considerable size, with Oolitic spherules scattered between, the whole being cemented together with highly crystalline carbonate of lime. It is either of a blue or light brown tint. According to M. Ebelman,* the blue tint is due to the presence of sulphuret of iron. Sometimes the ragstone is of sufficient importance to warrant its being quarried as an ordinary building-material, as at Ancaster, but in general it is too much cut up by joints and too thin to admit of this. Almost everywhere, however, it can be made into steps and landings. Its great durability is unquestioned, but it yields with difficulty to the hands of the mason.

The "Shelly Oolite," like the ragstone, is mostly composed of shells and scattered Oolitic granules, but the carbonate of lime cementing the whole together and the shells themselves are not so crystalline as in the ragstone, hence it is free and more easily worked. The quality of the stone in the different quarries is largely dependent on the state of crystallisation of the matrices of the shells and granules; and, as a rule, it may be taken that the more highly crystalline the matrix and the shells are, the greater the durability of the material. Moreover, it is usually more laminated than the true Oolites. The Shelly Oolite is characteristic of the Weldon and Barnack districts. Intermediate in structure between the Shelly and True Oolites,—*i.e.*, composed of less shelly matter and a greater proportion of Oolitic spherules,—come the freestones of Ancaster and Clipsham.

The "True Oolite" is a stone almost entirely formed of Oolitic spherules bound together with sub-crystalline carbonate of lime. Such a material may be met with in small quantities in many of the quarries under consideration, but it is best exemplified by the Ketton freestone.

We need hardly point out that as regards grain, the Shelly Oolite is the coarser stone and the True Oolite the finer. For fine carvings and undercuts, and general purposes, the Ketton and Ancaster freestones are very suitable; but for thick, large blocks, ashlar and bold mouldings, the Weldon and Barnack are useful. In regard to the connexion between grain and durability, it is certain that the coarser stones of the Lincolnshire Oolite do not yield to the influences of the weather more rapidly than do the finer; indeed, as far as our observations go, the former are occasionally more lasting than the latter.

The following are the chemical analyses and specific gravities of the principal stones under consideration:—

	Ancaster.	Ketton.	Barnack Mill.	Weldon A bed.	Weldon A1 bed.
Carbonate of lime.....	93·59	92·17	93·4	94·54	94·35
Carbonate of magnesia..	2·90	4·10	3·8	2·51	3·55
Iron.....	0·80	0·90	1·3	0·79	0·61
Alumina...				0·39	0·28
Silica.....	0·00	0·00	0·0	0·17	0·08
Water, &c....	2·71	2·83	1·5	1·60	1·13
Specific gravity.	2·68	2·70	2·63	2·45	2·42

The strength of the stones has been determined as follows:—

	Crushing weight, 2-in. cubes.
Ketton	91 cwt.
Ancaster	83 ,,
Barnack	65 ,,

	Tons per square foot. Cracked.	Crushed.
Weldon A1 bed	140·3	164·6
Weldon A bed	103·6	126·5

It is to be regretted that experiments as to strength or resistance to thrusting stress are not carried out with more method, so as to produce uniform data for comparison. As we have on a previous occasion remarked, a relative result cannot accurately be obtained by multiplying the effects produced on small cubes to make the terms synonymous with the larger foot or 6-in cubes. By that method they are not strictly comparable.

In regard to relative powers of absorption, 100 parts by weight become:—

Weldon A1 bed	109¾
,, A ,, ...	109

Bulk of water absorbed; total bulk being considered as unity:—

Ancaster	0·180
Barnack	0·204
Ketton	0·244

It is no part of our present purpose to discuss the relative merits of these stone-tests and experiments; but properly understood and studied with the text of our remarks they are of significant meaning. Enough has been said, we think, to show that the building-stones of the Lincolnshire Oolite are both interesting and instructive.

NOTES.

THE preliminary programme for the seventh International Congress on Hygiene and Demography, to be held in London on August 10, is now issued, but is understood not to be by any means final. The Prince of Wales has accepted the office of President, and the long list of the general committee includes a great many names well known in connexion with hygienic subjects: among others Sir Lyon Playfair, Mr. C. T. Ritchie, the President of the Local Government Board, Sir Andrew Clarke, Sir Spencer Wells, Sir James Paget, Professor Corfield, Dr. Richardson, Dr. Orme Dudfield, Dr. Farquharson, Mr. Rogers Field, and Mr. Baldwin Latham. Among the architects included in the list are Mr. Waterhouse, Sir A. Blomfield, Mr. Aston Webb, Mr. Charles Barry, Mr. R. W. Edis, Professor Banister Fletcher, Professor Hayter Lewis, Mr. Saxon Snell, Mr. Keith D. Young, and Mr. Ernest Turner. The sections as at present divided in the prospectus are I. Communicable Diseases; II. Demography and Industrial Hygiene; III. Hygiene of Infancy and Childhood; IV. Hygiene of Houses and Towns; and V. State Hygiene. "Demography" is defined to be "the study of the life conditions of communities from a statistical point of view." The objects of the Congress will be to awaken public interest in the progress of hygiene and demography; to afford persons interested in these subjects the opportunity of meeting with the object of advancing their progress, and by conferences and debates to elucidate questions relating to hygiene, demography, and public health. Among the subjects (as at present proposed) which are of special interest to our readers are, in Section II., diseases caused by various industrial occupations, and methods for their prevention, together with the sanitary requirements as to the hygienic conditions of factories, workshops &c.; and in the same section, the housing of the working classes; effects of the hygienic condition of large cities; degeneration of the physique of town workers. In Section IV. are included the subjects of the laying out of streets, height of buildings, air

* *Op. cit.*, p. 172.

* Bull. Soc. Géol. de France, 2 ser., t. ix., p. 221.

space about houses, density of buildings and of population in their relation to health; the planning, construction, drainage, warming, ventilation and lighting of houses and of public institutions; the supply and cost of water to communities, the treatment and utilisation of sewage, the treatment and disposal of house refuse, road sweepings &c. The proceedings will extend from August 10 to August 17 The occasion will be a very important one for the discussion of many points of vital importance to the inhabitants of such a city as London, and it is to be hoped that some new lights will be struck out from the papers and discussions at the meetings.

THE great strike of railway employés in Scotland still continues, both sides being too sanguine of ultimate success to give in. The traffic is being partially carried on in most districts, as some of the regular servants have resumed work, and are being reinforced by "importations" from this side of the Border. There are still engine-drivers, &c., eager for employment who lost their places through previous strikes, although a large number of the men so discharged found situations in the Colonies. Some of the strikers have, unfortunately, allowed themselves to be led into acts of violence, and serious rioting has resulted. Their behaviour on the whole has been very commendable, but they have lately been receiving some very mischievous advice. The Secretary of the National Dock Labourers' Union is reported to have told them that they could have fought their battle quite as well at work, and would have done better not to have struck at all. He recommended that signalmen should let the signals stand against the trains, that stokers should let the fires go down, and so on; adding that the dockers knew how to play that sort of game, and had tried it on with success. Mr. Tait, — the leader of the men on strike,—in calling upon those who had resumed work to come out again, remarked that the strikers could make the position of their brethren now working very uncomfortable, and he had no hesitation in telling them to do so. The companies naturally desire to prevent their loyal servants and "emergency men" from suffering for their fidelity; and as this would inevitably follow if the strikers should return to work on their own terms, the difficulty is thus aggravated. Attempted eviction of self-discharged men from the companies' cottages has still further increased the friction, and the unfortunate dispute seems a long way off settlement. Were Parliament sitting, efforts would probably be made to invoke State intervention, although it is hardly within the competence of the Legislature to interfere.

WE have received the printed programme for the new and more extended competition for the improvement of artisans' dwellings, to be opened by the French "Société des Habitations à Bon Marché," which was referred to in our Foreign news of last week. In order to keep the enquiry, which is part of the competition, within definite lines, a certain number of questions have been formulated to which competitors are requested to supply the answers. In regard to the first section, Existing Conditions, these questions are grouped under the heads "Généralités sur le mode de logement"; "Maisons habitées par une seule famille"; "Maisons collectives"; "Garnis"; "Conditions hygieniques"; "Intervention administrative"; "Taux de loyers et mode de payement"; "Facultés de transport"; "Consequences de l'état du logement." Full answers to the questions under these heads, for various localities, will furnish a very valuable body of evidence as to the existing conditions of lower class habitations in France. A second part to this section asks for answers in regard to the existing influences for the improvement of such dwellings, and information as to what is done by (1) "Interessés," the occupiers themselves; (2) "Action des patrons"; (3) "Action des Sociétés Philanthropiques"; and (4) "Action de Speculation." Under the second main section, "Projet d'Habitations," it is noted that the competitors are invited to make designs for habitations for special localities, in accordance with local custom and making use of the materials commonly employed in the district; and it is added that great importance will be attached to hygienic conditions, to lighting, ventilation, sufficient cubic space in relation to the number of inhabitants, water supply and drainage. In the general prefatory instructions it is suggested that it would be a great advantage to have local committees constituted to conduct the competition in regard to local circumstances; and in regard to designs for buildings it is specially insisted on that this is not to be an "étude dans l'air ou une dissertation théoretique," but that a special site available for model buildings must be selected and a design made *for that site*. Cottage dwellings, (*maisonnettes*) isolated or grouped, are to be preferred in the neighbourhood of manufactures situated in a country district, collective dwellings for towns. The comprehensive ideal of the scheme is eloquently stated in the following words from the prefatory remarks:—

"Pour utiliser et même susciter tous les bons vouloirs, ce concours ne se borne pas à une localité déterminée, qui n'aurait intéressé qu'un personnel restreint. Française est la Société, français aussi doit être le concours qu'elle institue. Partout où il y a des ouvriers, des paysans, des petits employés, mal logés, et à côté d'eux des hommes de cœur et de talent pour constater ce mal, s'en affliger et en chercher le remède, notre appel peut et doit être entendu. Le temps des solutions est venu: l'opinion publique, autrefois indifférente, les réclame aujourd'hui avec une netteté qui tournerait vite à l'impatience si on les ajournait; enfin notre Société, en donnant son aide et sa publicité aux efforts individuels, en les orientant et en les groupant, peut en hâter et en faciliter le succès. Ces solutions demandent la collaboration des architectes, des hygiénistes, des économistes, des financiers, qui représentent les différents points de vue du problème, mais qui, divers par la spécialité, sont uns par la philanthropie et le but à atteindre."

AT the British Museum the sculpture and architectural details of the small temple or Heröon at Xanthus, discovered by Fellowes, and formerly in the entrance hall, have for some time past been in process of re-arrangement, under Mr. Murray's direction, in the room at the head of the staircase leading down to the Halicarnassian room. The front colonnade has been built up as a restoration on the upper part of the south wall of the room, and the sculptures are arranged in the same room. The small model of the temple is temporarily placed in the room containing the remains of the Temple of Diana at Ephesus. Mr. Murray has brought out one curious fact in putting together the fragments of the pediment of the Xanthus temple. Portions of the statues which formed the acroterion and the terminals at the extremities of the pediment show that these did not stand, as they would be almost inevitably shown in a restoration, on horizontal plinths placed on the slope of the pediment, but the block forming the base of each statue was let about three inches into the upper surface of the pediment, the raking line of which was unbroken, the statues appearing to stand on the slope of the pediment. This is a new fact for architectural restorers of Greek temples. Mr. Murray believes that he has also an idea as to the function and position of the two archaic figures of lions, long familiar objects in the entrance hall of the Museum. No probable place can be found for these on the exterior of the temple, and an examination of the surface of the marble shows that it is in a very different condition from that of the statues which were obviously a portion of the exterior decoration. The marble surface of the lions is comparatively clean, fresh, and uninjured, except where actually broken, and has not the brown weather-stained appearance of the other figures and fragments of figures. Mr. Murray therefore conjectures, with every show of probability, that these figures stood in the interior of the small temple, and were perhaps supporters to a throne or shrine.

IT appears from the recent Parliamentary return that the net revenue of the Post Office is, in round numbers, over three millions, as against a net revenue of between one and two millions in 1872. It is certain, therefore, that the department should establish many more Money-Order and Saving-Banks offices all over the country. The latter are needed to increase habits of thrift among the people, the former that members of a family more especially may be able to assist each other when at a distance. This, in itself, is a species of thrift. It is well-known that in the building and carpentry trade men work in different places at different times of the year, their families residing all the year in one spot. These persons would benefit much by an increase of Money-Order offices. If the means of sending money home are close at hand, cash is saved which otherwise would often go to the public-house. Of course, there are many other ways in which an extension of this department would be beneficial to the whole community, and, therefore, it is to be hoped that the matter will be considered without further delay by the Postmaster-General.

IN reply to the recent memorial addressed to the Marquis of Salisbury on the subject of the preservation of Egyptian monuments, the *Times* prints a letter from the Foreign Office (dated December 25), stating that the memorial presented by Lord Wharncliffe will be forwarded to her Majesty's Agent and Consul-General at Cairo for presentation to the Egyptian Government. The letter continues:—

"Sir E. Baring will be instructed to state that her Majesty's Government consider the question of the nationality of the official to be appointed to such a post to be a matter which lies wholly within the competence of the Egyptian Government, and that their only desire is that adequate steps should be taken to preserve the monuments from further destruction or mutilation."

A NEW postal regulation, under which letters may be forwarded by railway, is announced by the Postmaster-General to come into operation next month. "Railway Letters" will be accepted for conveyance by the next available train, on being tendered at any parcels booking-office, for the sum of 3d. They must not weigh more than 1 oz., and a 1d. stamp must be affixed in the usual way, the remaining 2d. being paid to the railway officer on handing the letter in. The payment will defray the cost of transmission to the station of address, but as the railway companies do not undertake delivery, the letter must either be addressed "till called for," or "to be posted on arrival." In the latter case it would be posted immediately on arrival at the receiving station for the next delivery by postman. The Railway Companies are responsible to the Postmaster-General, and letters transmitted under this arrangement are deemed to be in all respects letters sent by post, and the ordinary conditions and regulations of the Post Office will apply to them. This arrangement will probably be found very convenient in certain emergencies, as, at the present time, no letter can legally be sent by rail. Of course, urgent communications frequently are sent by train, but they are treated by the railway company as "parcels," and the lowest charge—except for short distances—is 6d. It will be noticed that any missive weighing over 1 oz. will still be excluded from the new service, and will either have to be forwarded as a parcel or wait for the next mail.

WE referred the other day to the fall of houses in Bombay, which caused the death of a number of people, and to the apparently unsatisfactory state of building legislation in the Indian cities. We now learn from the Calcutta correspondent of the *Times* (Wednesday) that two Mahommedans

who were apparently responsible for the erection of the building have been arrested on a charge of culpable homicide, and that bail has been refused. This looks as if the local authorities had been at last awakened to the necessity of vigorous action to put a stop to such dishonest and dangerous building.

BARROWBY, in the Grantham Rural Sanitary District, appears to be suffering from the evils not so much of bad drainage as of insanitary water-supply. Dr. Parsons, who has reported to the Local Government Board on the subject, says:—

"There are few water-closets connected with the sewer, most of the houses having privies with deep underground cesspits, which in some cases could be seen to be constructed of dry brickwork, a construction facilitating soakage of foul matters into the subsoil.

The water supply of the village is obtained from wells, said to be about fifty-six in number; each block of property, as a rule, having its own well. . . . Mr. Harrison, well sinker, of Barrowby, tells me that in the wells newly sunk it is the practice to make the upper part of the well, from the top of the clay upwards, watertight, with brickwork set in cement, and a backing of clay; and he thinks that if the wells were always so constructed there would be no difficulty in getting good water. The generality of the wells, however, are not constructed so as to exclude water from superficial sources, being steined in the upper part only with dry stone or brickwork (the top courses only being set in mortar), while below the steining the sides of the well are formed only of the bare rock. In some instances dark stains were seen running down the inside of the well at its upper part. Many of the wells are so situated as to be in danger of contamination by privies, pigstyes, 'crew-yards,' &c."

Recommending that the Rural Sanitary Authority should, as soon as possible, obtain the advice of an engineer as to the best means of providing Barrowby with a sufficient supply of wholesome water, Dr. Parsons appends the following useful note as to the circumstances:—

"I may point out that if a well be found to be polluted with organic matter, merely to clean it out is a very futile proceeding. What is required is so to construct the well as to exclude polluting matter from entering it, and if this cannot be done, the well should be closed. Where the water-bearing bed lies under an impervious bed of clay, the polluted top-soil water should be excluded by making the well water-tight as far down as the clay bed. A way of doing this, which has been successfully adopted in some districts, is to use, for steining the well, large-sized glazed socket-pipes, such as are used for sewers, but set vertically, and with the joints securely caulked. For this purpose, pipes are sometimes made with the flanges inside. The same object may in some districts be attained by the use of Abyssinian tube-wells.

But where there is a general pollution of the water-bearing bed, as would appear from the analyses which have been made to be the case at Barrowby, the only safe course is to obtain a supply from an outside source, free from the risk of contamination."

MR. SPEAR'S report to the Local Government Board on the fatal prevalence of scarlatina in the First (Central) Division of the Neath Rural Sanitary District, gives the following account of the sanitary condition of the most important village in the district, Coedfranc, with a population of about 4,400:—

"The houses near the highway are drained, very often by roughly-constructed channels, which pass frequently beneath the houses to the roadside gutter, where the sewage causes, at various points, considerable nuisance; those in the side streets, or further removed, not possessing even such facilities as the roadside gutter affords, are even more unsatisfactorily circumstanced. Sewage accumulates in pools or ditches about the houses, as at 'The Abbey;' or, as is chiefly the case with the newer property, is discharged into leaking and unventilated cesspools or 'dumb-wells.' One collection of houses near the railway station at Dynevor had, I found, been drained after a certain fashion; the drain in places was partly above the ground-level, it was provided with catch-pits in its course, it was unventilated, and it discharged on to the railway embankment in such a way as to occasion nuisance to the passers-by. Excrement disposal is generally by old-fashioned privy-pits. These often contain an accumulation of twelve months or more; are dilapidated and foul. A very few of the newer houses have been provided with small box-closets, *but no public provision is made for the emptying, and they, too, accordingly, are allowed to overflow, and to become a nuisance.* The removal of ashes and house-refuse is effected by the Authority under a contract."

This is another example of what we have so frequently noted, of the evil effects of leaving such sanitary operations to the will of a poor and ignorant populace.

SOME further demolition is about to be made on the eastern side of Fetter-lane, opposite to the side of the Record Office building. This will involve the removal of No. 24, of which the *Globe* says: "It was a chosen haunt of Charles Dickens in his younger days, and is evidently the original of the 'Old Curiosity Shop.'" This may, perhaps, be the case; but we find no passage in the novel whereby the locality of the house of Little Nell's grandfather can be fixed, either in Fetter-lane or elsewhere. The present tenant, Mrs. Haines, who has received notice to quit this month, has to tell many an anecdote concerning men of letters during the past fifty years or so, and claims to have given its name to *Punch*. The house in question is also the reputed home in the lane of Dryden, in rivalry of that other one, being No. 16, a few yards nearer to Fleet-street, to which we referred in a "Note" on January 29, 1887. No. 16 was distinguished by a tablet inscribed, yet on no certain authority: "Here liv'd John Dryden the poet. Born 1631. Died 1700. Glorious John"; and by its quoins and two lions' heads. It was pulled down shortly afterwards. If No. 24 is of Dryden's day, it has been much altered in appearance since, for it is now coated in front with stucco, and the windows, with their sashes, are modernised.

ST. BENET'S CHURCH, Paul's Wharf, or St. Benet Hythe, in Castle Baynard Ward, narrowly escaped from the fire which did so much damage last week in Upper Thames and Queen Victoria-streets.* It is the one survivor of the four City churches dedicated to St. Benedict; the three others being St. Benet Sherehog, Ward of Cheap; St. Benet Grasschurch, Bridge Ward Within; and St. Benet Finke, Broad-street Ward; and is mentioned in Dean Ralph de Diceto's survey of *circa* 1180. The earlier church that stood on this site has some claim upon our notice, for it contained the grave,—with the monument for which, albeit poor enough and persecuted in his old age, he devised 100*l.*—of Inigo Jones, buried June 26, 1652. The present fabric was built, after Wren's designs, in 1683, at a comparatively large cost of 3,328*l.* 18s. 10d., for the united parishes of St. Peter and St. Benet, Paul's Wharf. It is constructed of red brick with alternated brick and plastered quoins, and has composition festoons and wreaths over the windows; the tower, at the north-western angle, in three stages, has a bold cornice and blocking course, and is surmounted with a ribbed leaden cupola, having rounded openings, an octagon lantern to correspond, and vane; the roof is gabled. The body of the church measures 87 ft. by 60 ft.; the interior is in the Corinthian order, and has an aisle along the north side. The churchyard, to the north, has been thrown into the street. By an Order in Council of July, 1879, this church, formerly a rectory in the gift of the Dean and Chapter of St. Paul's, was made over to a Welsh congregation, and the two parishes were united for ecclesiastical purposes with that of St. Nicholas Cole Abbey. The church of this latter is said to be the first to have been erected and finished by Wren after the Great Fire. St. Nicholas Cole Abbey was restored in 1889, and now serves for the united benefices of St. Nicholas Olave, St. Mary Mounthaunt, St. Mary Somerset (whose tower was spared) in Queenhithe Ward, &c. That St. Benet's stands near to Heralds' College very probably accounts for the circumstance that therein were buried Sir William Neve, Clarenceux, Ashmole's friend; William Oldys, Norroy, in the aisle (1761); John Philipott, Somerset (1645); and J. C. Brooke, Somerset (1794). In the old church Elias Ashmole, afterwards Windsor Herald, was married to his first wife, in 1638, the year of his admission as a solicitor in Chancery.

* "St. Benet's Church, with front, roof, and tower, damaged by fire; rest of building and contents slightly by water, and door broken open."—Captain Shaw's official report.

THE destruction of Hurstbourne Park House by fire is regrettable, as every useless destruction of property must be. But it is a matter of still greater regret that valuable works of art which cannot be replaced should also have been destroyed, as, for example, Kneller's portrait of Sir Isaac Newton. When private works of art become public property, there is among many a feeling of regret; but there can be no doubt that pictures of inestimable value are in daily danger in large country houses. The extraordinary thing is that persons who can afford to keep up these palaces make such contemptible provision against the destruction of their property by fire. It was not very long ago that we called attention in these "Notes" to the unsatisfactory system at present in force in country towns and villages for the prevention of fires. It would be well worth while for the great insurance companies systematically to take up this matter. Meanwhile, every person who owns pictures of national interest should care that they are not rashly exposed to destruction.

SINCE the death of Leech, the artistic staff of *Punch* has suffered no such loss as that it sustains by the death of Charles Keene. He was not the most generally popular artist on *Punch*, for his humour was too serious and fine-pointed for the masses to appreciate, and probably none of that "middle class" who were the special subjects of his pencil understood or cared in the least for his portrayal of themselves. He, in fact, sketched and studied the "middle class" for the edification and amusement of the "upper class," but in no unkind spirit. He never for a moment caricatured, but produced his effect by delicate perception of real character and manner; and though, of course, drawing in black and white is not like painting a finished picture, as far as originality and characteristic expression go one of his drawings was often worth a dozen of average academy pictures. His manner of execution, working a great deal by a kind of line method rather resembling etching, was disliked by some as "scratchy" (as we have heard it termed), but it was his own, and gave an additional individuality to his work. If he was himself the author of the title-sentences to his drawings, he gave ample evidence that he could be witty in words as well as in drawing: some of them have almost passed into proverbs. His work has been highly appreciated by French critics; and in an able article in the *Revue des Deux Mondes* some years ago it was observed that any foreigner who wished to understand the English middle class should study above all things the sketches of Keene.

WE have received from the Council of the Art Union a portfolio of four etchings, "as a specimen of what they are now doing to carry out the objects of the Society." They are "The Cloverfield," etched by Mr. E. Barclay after the picture by T. Barber; "Entrance to Pisa from Leghorn," by Mr. C. O. Murray, after Constable; "House at Hampstead," by Mr. H. R. Robertson, after Constable; and "A Windmill" by Mr. Percy Thomas, after Crome. These are fine and artistic etchings after fine originals, and we heartily congratulate the Art Union on having substituted work of this class for the large and coarse engravings of "popular" pictures against which, we believe, we were the first to protest.

BY the death of Mr. John Marshall, the Royal Academy loses a valuable coadjutor. Mr. Marshall, as is well known, had for many years filled the important office of Professor of Anatomy to the Academy, a post for which he was qualified equally by his accurate knowledge of the subject and his power of clear and logical exposition. His "Rule of Proportion of the Human Figure," a short treatise accompanied by large plates, giving his idea of the control or normal type of the figure, is a standard work.

IN an interesting article entitled "Impressions of Peru" in the current number of *Harper's Magazine*, Mr. Theodore Child gives the following description of the constructive method of architecture in Lima:—

"The cathedral is a very large and curious building of grand proportions, with an imposing façade, approached by a flight of stone steps, and flanked by two towers in the Spanish Jesuit style. . . . . But, like Constantinople and other Eastern towns famed for their picturesqueness, Lima will not bear close examination. The cathedral is built of mud, timber, bamboo-cane, common bricks, sun-dried bricks, and such light material, faced with stucco, all in a bad state of repair. Inside it has a vaulted Gothic roof with mouldings of white plaster; but where the plaster has peeled off you see that the whole roof is a mere light framework of wood, covered in with fine bamboo-canes and twigs laid closely together lengthwise, and strengthened by cross-pieces. On the inside these canes are coated with white plaster and on the outside with brown mud, and this is sufficient; for at Lima it never rains, and the moisture of the winter mists is not sufficient to penetrate through the thin layer of earth that is spread over the flat roofs of the houses. . . . . The church of Santo Domingo has a very lofty tower, likewise of timber, lath, and plaster, painted white to imitate marble, and enriched with tier after tier of lapis-lazuli pillars, composed of stucco painted blue and veined with yellow."

WE have received the prospectus of a proposed great labour exhibition to be held in London this year, under the auspices of the Associated Trades Unions, but to be directly managed by an organising Committee to be elected at a general meeting of the delegates of Trades Unions. The serious part of the Exhibition will consist of workshops in which various trades will be carried on under public inspection, as well as exhibits of such work as cannot be manufactured in the building. The lighter attractions of the Exhibition are to include pictures, historical and geographical museums, musical performances, *fêtes*, and athletic displays. In regard to these we must quote the words of the prospectus:—

"An important feature in the entertainments will be *athletic displays*, which should, and no doubt will, exercise a most beneficial effect upon those whom it is intended this exhibition should principally benefit, viz., the working classes. Physical health goes a very long way towards producing a contented mind, and our toilers would do well to follow in the steps of the ancient Greeks, who divided their subjects of study into music and gymnastics—the one comprising all mental, the other all physical training. The Greeks were the first to develop a science of education distinct from book-learning, and we cannot do better than imitate them. Plato lays great stress on the influence of race and blood. According to his dictum, strong and worthy children are likely to spring from strong and worthy parents; and music and gymnastics develop the emotions of young men during their earlier years—the one to strengthen their character for the contest of life, the other to excite in them varying feelings of enthusiasm or tenderness."

This is really magnificent, and we cannot pretend to add anything to it, except the caution that those who are engaged in outdoor manual labour have less need of athletic exercises, and less physical strength at liberty for them, than those who are engaged in indoor sedentary work. The exhibition thus projected is to remain open for six months, and the projectors are sanguine of obtaining four millions of shilling visitors, basing their calculations on the receipts at such exhibitions as those of 1851 and 1862, and the recent ones at Edinburgh, Liverpool, and Glasgow. We should be very glad to hear they had been so financially successful, but we doubt if they will find their exhibition the same kind of 'draw" as some of those referred to. A more serious mistake is in the ostentatious proclamation that the object of the exhibition is to show to the world the true greatness of the working man. Previous exhibitions, we are told, have ignored the artisan, just as in the theatres, we are told,

"The leading actors alone can approach the footlights. The minor characters have to keep in the background, and a crowd of machinists and scene-shifters, without whom the play could not proceed, remain unseen in the wings and behind the scenes; not even a shadow of satisfaction is given to their modest and legitimate vanity."

This is the old story over again of the organ-blower who claimed to share in the applause given to the player. The common sense of the world has decided otherwise, and in this respect the world is not likely to alter its mind, in spite of the magniloquent declaration of the prospectus that

"By giving the workmen of all trades and of all countries the opportunity of showing what their mighty labours can accomplish, *the attention of careless people will be aroused, ignorant people will be instructed;* and the last doubt and hesitation of public opinion will be swept away by these convincing proofs."

A labour exhibition is in itself an admirable idea, and we should desire every success for it; but the promoters would be far more likely to gain public sympathy and respect if they had announced it without all this absurd display of "bunkum" and big words. Good taste, however, is among the many little things which the British workman, with all his self-satisfaction, has still to learn.

THE BURLINGTON HOUSE LOAN EXHIBITION.

THIS is the twenty-second winter exhibition of "The works of old masters and of deceased masters of the British School" (observe the delicate distinction between "old" and "deceased") which has been held at the rooms of the Royal Academy, and remarkable as has been the vitality and variety of these exhibitions one is led to question whether the time has not come to begin over again. The interest is kept up in one way or another, but year by year the really great pictures become fewer in number, though we have never been without some of the very highest class. Perhaps the twenty-fifth year, now not far off, may be a convenient epoch to accept either for closing the series (*absit omen*) or for endeavouring to work on the minds of owners or their representatives to give a fresh loan. Many of the owners when the loan exhibitions were started are probably now dead, and the present owners would therefore only feel it as a first request. A new generation has sprung up since the loan exhibitions were started, which has little conception of their pristine glory, and of the filling of whole galleries with works of such beauty as are now only to be found by the half-dozen or so, among a number of works of only moderate interest. The scheme was begun, in fact, in too prodigal a manner. Nearly the whole range of galleries was filled with great paintings in the first three or four years' exhibitions. The result was most striking for the time, but this prodigality wasted too soon the riches of the nation in pictures (great as these are), besides presenting more at a time than could be fully studied. If the attempt were made in a year or two to recommence, there is enough material available to keep up high-class exhibitions of old masters for a longer period than a quarter of a century, if only the mistake is not again repeated of being too lavish at first.

Though the "Old Masters" portion of the present exhibition is not one of the most interesting that has been, it contains really great works. The best of these are to be found in the large room, where as usual the south wall forms the main display. Here we find Reynolds's splendid portrait of Miss Kennedy (132), a work which the artist at the time considered "had more grace and dignity than anything he had ever done," and which justifies his satisfaction. The face is a noble one, painted with great delicacy, the attitude dignified, the costume rich and picturesque. Another interesting "Reynolds," though not nearly equal to this, is "Miss Horneck" (134) in Persian dress, seated on the ground facing the spectator: the Oriental attitude being apparently suggested by the Oriental costume. This is a picture of distinct individuality in colour and treatment; but the torso looks much too small for the head. Reynolds's "Young Fortune-tellers" (137), portraits of the children of the fourth Duke of Marlborough, is a charming child picture, but suggests the idea that the painting has been refreshed in parts. Then there is Romney's in every way superb-looking portrait of Lady Milnes (an ancestress of Lord Houghton's), a tall grand-looking woman in a brown silk dress and large hat, her hand placed on the pedestal of a column; the whole air and attitude of the figure form a kind of ideal of aristocratic pride, a little too self-conscious. The same wall contains Turner's two views in Lowther Park, belonging to the Earl of Lonsdale, one of which is rather tame, but the other (131) is a beautiful example of Turner in his more delicate moods: the effect of graduated sunlight on the rounded hill in the middle distance is remarkably beautiful and true.

Among the other paintings in the large room that may be singled out for special mention is the curious and in its way remarkable work by Sodoma, "St. Jerome" (110), a life-size kneeling nude figure of bronze-like colour and painted with mechanical hardness, force, and precision. Gainsborough's fine and spirited portrait of a naval officer, "John Augustus, Lord Hervey" (98), leaning against a gun, is one of the best things in the room, which also contains examples of Claude ("The Trojan Women Setting Fire to the Greek Ships"), Murillo, Velasquez (equestrian portrait of the Duc d'Olivarez) Moroni, and other well-known names, not represented however at their best.

In the first room hangs Etty's "Scene from Comus" (13), so-called; in reality a painting of the golden tree and the Hesperides as described in Comus. This is a remarkably good work in a decorative sense, both in regard to colour and composition. Its defect is the defect of all Etty's works, the total want of elevation of style in his figures; they are always admirable in colour, they seldom escape something like vulgarity in conception and design. De Loutherbourgh's two "Sea Fights by Night" (11 and 14) go to confirm his reputation as a mere scene-painter, and have no business here except on the ground that it is well to let the truth be known about false reputations. Turner's "Wreckers" (21) is an example of his late style, and his "Sheerness" (36) of his earlier style; they are neither of them of his best work, and the boats in the latter are very bad. Two pictures by Landseer, "An Event in the Forest" (34) and "Lost Sheep" (38) are of interest; the latter, where a Highland shepherd with his collies is exhuming some sheep from under deep snow, is an admirable example of Landseer's work. Among other paintings in this room are several landscapes by Crome, one or two of them rather out of his usual style of subject, and Romney's charming portrait of Lady E. Cavendish-Bentinck (10), a bust portrait in a hat and cloak.

The Second Gallery, devoted as usual to Dutch pictures, contains a really remarkable work by Jan van Meer, "The Soldier and Laughing Girl" (52), remarkable for its artistic feeling and powerful effect of light. The soldier sits in shadow in the foreground with his back nearly to the spectator, the woman laughing has the full light on her face; the painting in detail is not very refined, the power of the picture lies in the strong sense of pictorial effect which it displays. There are two or three remarkable works by Frank Hals, of which "Le Joyeux Buveur" (72), a laughing man lifting on high a glass drinking cup, is perhaps the finest. The two portraits of men of a more respectable order (69 and 71) are full of Hals's peculiar *bravura*, which to our thinking is somewhat over-estimated, and there is a trickery about the painting of the beard and moustache (in No. 69 especially), the hairs being painted in separate in a stringy fashion which gives an effect, but is contrary to truth. The De Hooge lent by the Queen (85) is a good example, and the Terburg, "The Letter" (92), also lent by her Majesty, is one of the finest specimens of the painter in regard to execution, though the extreme and defiant ugliness of the woman holding the letter takes away nearly all the enjoyment one would otherwise have in the work. Among the pictures in this room a hard topographical view of "Old London Bridge, 1630" (63), by Claude de Jongh, is of considerable interest in its way.

The collection of early oil paintings, arranged as usual in Gallery IV., includes a good example

of Bernardino Luini, "The Nativity" (140), and an interesting series by the same painter of the "History of the Three Martyrs" (143-4-5). A small Mantegna of the "Virgin and Child" (152) is remarkable for its special colour treatment, the background being filled with cherubic figures of crimson colour. Giovanni Bellini's "Virgin and Child" (155) is a fine work; and a most remarkable and extraordinary painting is that by Andrea del Verrocchio of "St. Michael trampling on Satan" (157). Satan, with bats' wings, rises half-way out of the ground, from a cleft in the rock at the edge of a chasm, the archangel standing on the margin above plants one foot on the shoulder of the fiend to keep him down; to the right stand Job, an old man with long grey hair and beard, rather recalling the conventional figure of Time, and St. Andrew, as witnesses of the scene. The figures are finished with great brilliancy in a stiff archaic manner, and the whole is a remarkable example of the strange conceptions of religious painting in the early days of the Renaissance. In the same gallery also should be noticed Lucas Van Leyden's very remarkable work, after its fashion, representing "Solomon and the Queen of Sheba" (169). The meeting takes place in a hall surrounded with most elaborately-painted and very corrupt Renaissance architectural details, through the door is seen an open court with still more curious architecture in sunlight on the other side, and a woman bathing in a cistern in the middle of the court. The group of Solomon and his attendants is a *tour de force* of brilliant painting of rich dresses of most curious and effective design, and there is something remarkable and impressive in the figure and action of Solomon, independently of his stiffly brocaded drapery. The whole is an exceedingly valuable and curious study of conventional idealism, as it may be called, completely mediæval in feeling, in spite of the Renaissance architecture.

But the strength of the exhibition is this year, as last year, in the water-colour room, which has recently been set apart for special collections. Last year it was the designs of Alfred Stevens, this year it is a collection of works in water-colour, arranged more or less chronologically. We begin in the small "Black and White" room with the works of the early artists with their restricted palettes; Paul Sandby's views at Windsor and in Hyde-park, followed by other names less known to fame. Two drawings by "Michael Angelo Rooker, A.R.A." both entitled "Ruined Abbey, Shropshire" (10 and 11) are excellent examples of architectural drawing. John Robert Cozens is represented by some mild and grey-toned views in Italy, of which the "Convent on the Walls of Naples" (16) has the most character. François Francia's "Lambeth Palace" and "Landscape" (30, 31) are good little works, and Barrow's carefully-executed and realistic view of the "Pool of London" (33) during the great frost of 1789, with the ships piled helplessly on hummocks of ice, has plenty of historical interest, and is a painstaking piece of work in its way. Henry Edridge is represented by some good little drawings, "Wormley Church" and "Rouen Cathedral" especially, and then we come to the real beginner of the English water-colour school, Girtin. His "Tattersall Castle" and "White House, Battersea-reach" (39 and 41) are works of real genius, the latter especially a remarkable example of a fine picture made from the simplest materials, the White House and its reflection standing out as the one spot of light in the picture, which looks like a forecast of Turner. This can hardly be said of the view on the Exe (42), "with rainbow," as the catalogue very unnecessarily adds; a rainbow sticking up from the ground, as solid as if built up with planking and painted. This early portion of the collection ends with a fair selection of drawings by John Varley, who is not, however an advance upon Girtin.

Back to back with Varley, on the other side of the wall, comes John Sell Cotman, one dash of whose rich full colour seems enough to burn up all the Sandbys and Varleys. The drawings exhibited are mostly little more than sketches: but what sketches! what masses of light and dark, blazing skies and inky clouds, and shadowy hills. Even David Cox loses something by coming after Cotman, though there is more of the light and air of common day in his drawings, occasionally somewhat *too* "blottesque." Somehow his large drawing of "Sherwood Forest" suggests Sir John Gilbert, and we almost look to see the foreground filled with steel-capped riders. After David Cox comes Turner, a small collection of drawings, few of them representing his finest work, but differing from all the other sets we have looked at in their remarkable variety of power, the work of a genius of the first order, not tied down to a favourite set of effects. The finest perhaps is a quiet and probably early work, "York" (87), looking along the river, with the towers of the cathedral in the distance. De Wint, who follows, is not represented to great advantage, but at the top of the room is a splendid little collection of William Hunt's works, showing his special powers at their best. There are some exquisite still-life pictures, the beautiful one of the old man seated at table, called "The Blessing" (113), two boys shivering in "A Cold Morning" (112), and perhaps most remarkable of all, though less finished than many of them, "The Cricketer" (108), a boy raising his bat for a regular "slog," with an expression of furious energy in his heated face which is almost sublime.

George Barrett is but a mechanical landscape painter, a maker of pretty pictures, to come after Cotman and Turner. Barrett worked carefully according to his lights, but his neatly-arranged scenes are not things to be enthusiastic over. Nor is Samuel Prout's "Porch of a Cathedral" (125) with its cleverly-indicated details never made out properly, and his little tricks of shadow points in the jointings of the masonry; craftsmanship rather than art. There is a certain power in the loaded view across the sea from a rocky foreground, by "William Turner (of Oxford)," as he is parenthetically labelled to distinguish him from the greater artist whose name he was unfortunate to bear. Havell and Bonington, once names to conjure with, are hardly so now, though they keep their right to a place in the show. Bonington's work is indeed admirable, only it is all alike, the repetition of one idea. These names retire into respectable mediocrity behind those of Samuel Palmer and J. F. Lewis. The latter is best represented by his superb drawing "The Reception" (142) in a harem, a work which is an absolute glow of rich colour (can this really be the same branch of art as was represented by Sandby's monochromatics?), and finished to perfection in every detail. The "Lilium Auratum" (143) would be a highly-finished drawing among the works of most artists, though here it only figures as a study for the picture exhibited a good many years ago at the Academy. Samuel Palmer was a genius restricted in his walk; he had one effect or one class of effect only, but that is a very grand one, and in his fondness for illustrating Virgil and Milton he showed a true perception of his powers, for there is something distinctly epic in the style of his rich landscapes with their golden sunsets; loaded with body colour as they are, they have the effect of great oil paintings reduced to a small scale, as if seen through the small end of a lorgnette. The principal works of his here are the "Lycidas"—

> "Together both, ere the high lands appeared
> Under the opening eyelids of the morn:"

"Tityrus restored to his patrimony," and "The Golden Hour," a small sunset picture which is perhaps the most successful of all.

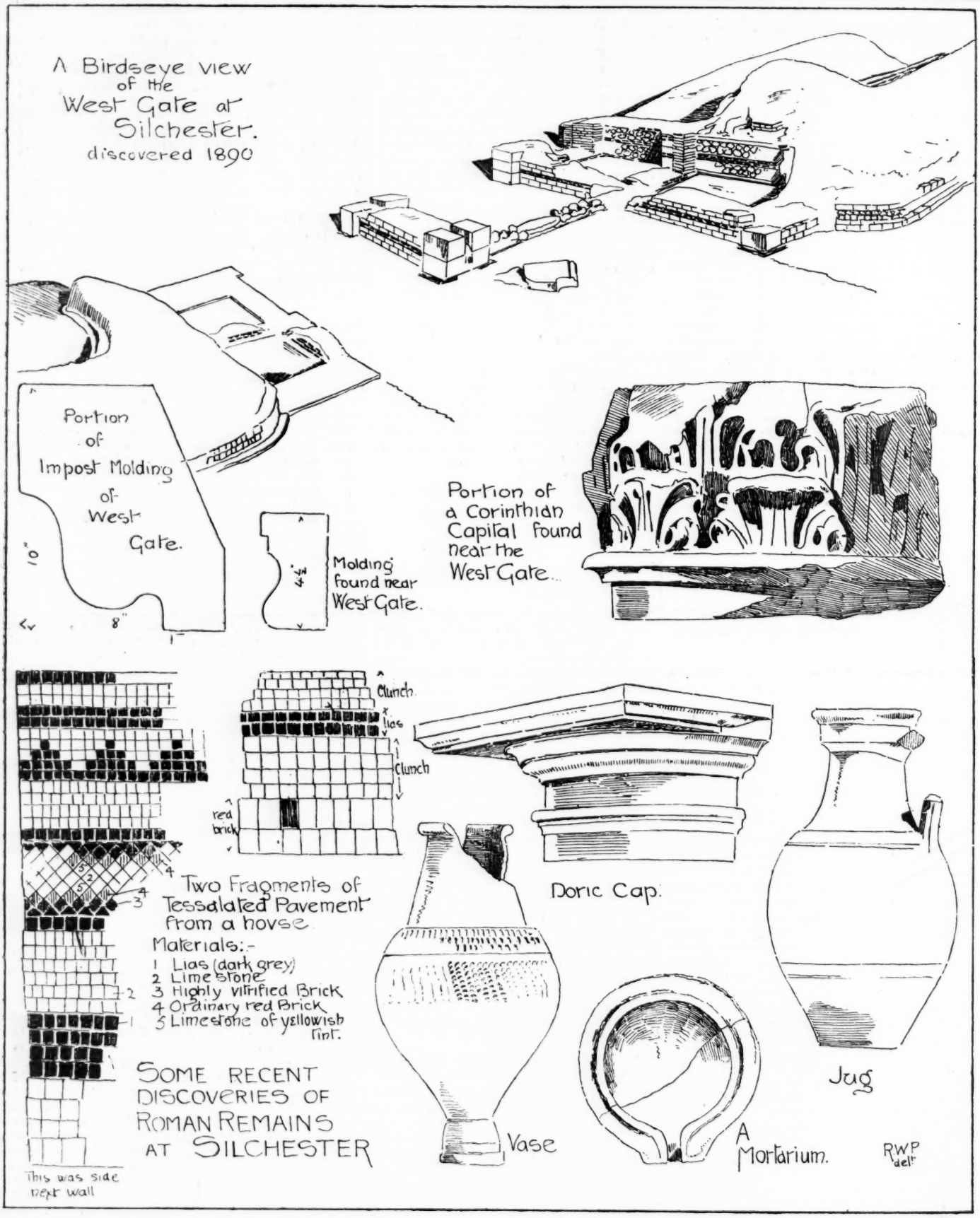
The collections ends worthily with a selection from the beautiful works of Frederick Walker, which no lover of English art can ever see without the keenest regret at the early death of one who was such a master, and would have done far greater things had he lived. As it is, this small collection of drawings is, or should be, the greatest attraction of this year's exhibition. The remarkable thing about Walker is his combination of rich and broad effect of colour with the highest finish and character in the figures. "The Ferry" (158) is one of the most noteworthy in this way; the whole composition is beautiful in its calm effect of soft rich light and colour, while the figure of the girl seated in the stern of the boat, small as it is in dimensions, is a complete study in itself. The little picture entitled "Waiting for Papa" (148), where an overdressed little girl and her fond foolish mother are visiting an orphan school, is a remarkable example of Walker's power of character painting on a small scale; the touching and expressive beauty of the orphan girl first in the rank are pathetically contrasted with the commonplace of the richly-dressed comfortable-looking mother and daughter. In this, as in such works as the "Wanderers," the "Harbour of Refuge" (or, as it is here called, the "Vale of Rest"), Walker showed that he was something more than a painter, even of the best; he was a student of life expressing his feeling on it through painting. Of this highest class of painters there are few indeed, in England at least; and none of those few keep the balance between the artistic and the moral side of painting as completely as Frederick Walker did.

SILCHESTER.

WE are enabled to give, by the kind permission of the Society of Antiquaries, some sketches of the recent discoveries of Romano-British work on the site of the ancient city of Calleva Attrebatum, now called Silchester, in Hampshire, situated three or more miles from the Mortimer Station of the Reading and Basingstoke branch of the Great Western Railway.

The site is a large extent of arable land of about a hundred acres, in the form of an irregular octagon, enclosed by a Roman wall 10 ft. in thickness and in places nearly 20 ft. in height. "It is of the usual construction of Roman city walls in this country, except that the tile courses, so prominent a feature in the walls of Roman camps and towns, are here supplied by lines of flat stones, and that the intermediate courses are laid here and there in herring-bone fashion." Of the four principal gates the north and south were partly excavated by the late Rev. J. G. Joyce in 1872. The west gate has now been unearthed, and a model to ½ in. scale made of it, and from this the bird's-eye view which we give has been taken. As will be seen by the drawing, the bases of the piers which supported the double arches remain very perfect, and the walling, composed in some places of alternate double layers of flint and brick, in others of stone and brick, is in places some considerable height. The foundations of the guard-room are also shown, and a section of a portion of the moulded impost, of brown sandstone, which was found just below its original position at a short distance in front of the central pier. The stone shows on one side (that facing the spectator in the view) a portion cut away to receive the gate itself. Here also was found a portion of a large Corinthian capital (which is also given), with some boldly-treated acanthus. The foundations of the gate itself were of flints, without cement, but probably well rammed, and the footings of the piers themselves were of brick, and show slightly in the sketch. The view also gives some idea of the nature and construction of the outer wall adjoining the gate, and the Celtic earthern mound with which it is backed on the inner face.

Coming now to the discoveries made on the site of the city itself within the walls, among the principal buildings found by the late Rev. J. G. Joyce were two large houses in the north-west quarter of the city. The *insula* on which the larger of them was situated has now been further excavated, and another house of even larger size than the other has been found. Of this, by the kindness of Mr. G. E. Fox and Mr. St. John Hope, we are enabled to give a plan. As will be seen, the arrangement, no doubt adapted to the climate of the country, was entirely different from that in general use in Pompeii and Southern Europe. The general idea seems to have been to arrange the rooms round corridors, the *atrium* and peristyle, as in Pompeian examples, not appearing at all. There were three hypocausts in the house under notice, and considerable remains of the tesselated pavement were also found; of portions of two we give two sketches. The larger one was found at the spot marked A on the accompanying plan, and forms part of a border which perhaps enclosed a pattern with figures or animals. The material used was clunch (or a fine limestone), lias of a very dark grey colour, ordinary brick, vitrified brick, and a yellowish tinted limestone. The clunch and lias were the most common, but in the central portion of the border a very clever arrangement of the materials produced a graduated effect, from the white of the clunch in the central row of tesseræ to the deep grey (which, when moistened or waxed, became almost black) of the two outer rows. The tesseræ were of two sizes, 1 in. and ½ in. square, the larger size being used for the outer rows of tesseræ against the walls. We give also one or two examples of pottery found. The vase has some delicate ornament, made by a modelling-


A Birdseye view of the West Gate at Silchester. discovered 1890
Portion of Impost Molding of West Gate.
Molding found near West Gate.
Portion of a Corinthian Capital found near the West Gate.
Clunch
tias
Clunch
red brick
Two Fragments of Tessalated Pavement from a house
Materials:-
1 Lias (dark grey)
2 Limestone
3 Highly vitrified Brick
4 Ordinary red Brick
5 Limestone of yellowish tint.
This was side next wall
Doric Cap.
Jug
Vase
A Mortarium.
RWP del.
SOME RECENT DISCOVERIES OF ROMAN REMAINS AT SILCHESTER

tool, apparently, and giving it a good deal of character. The *mortarium* shown has had the grains of quartz, which were embedded in the bottom to assist in grinding up the food, entirely worn away, and was probably thrown away as useless.

We may here quote from the Report of the Executive Committee of the Society of Antiquaries:—

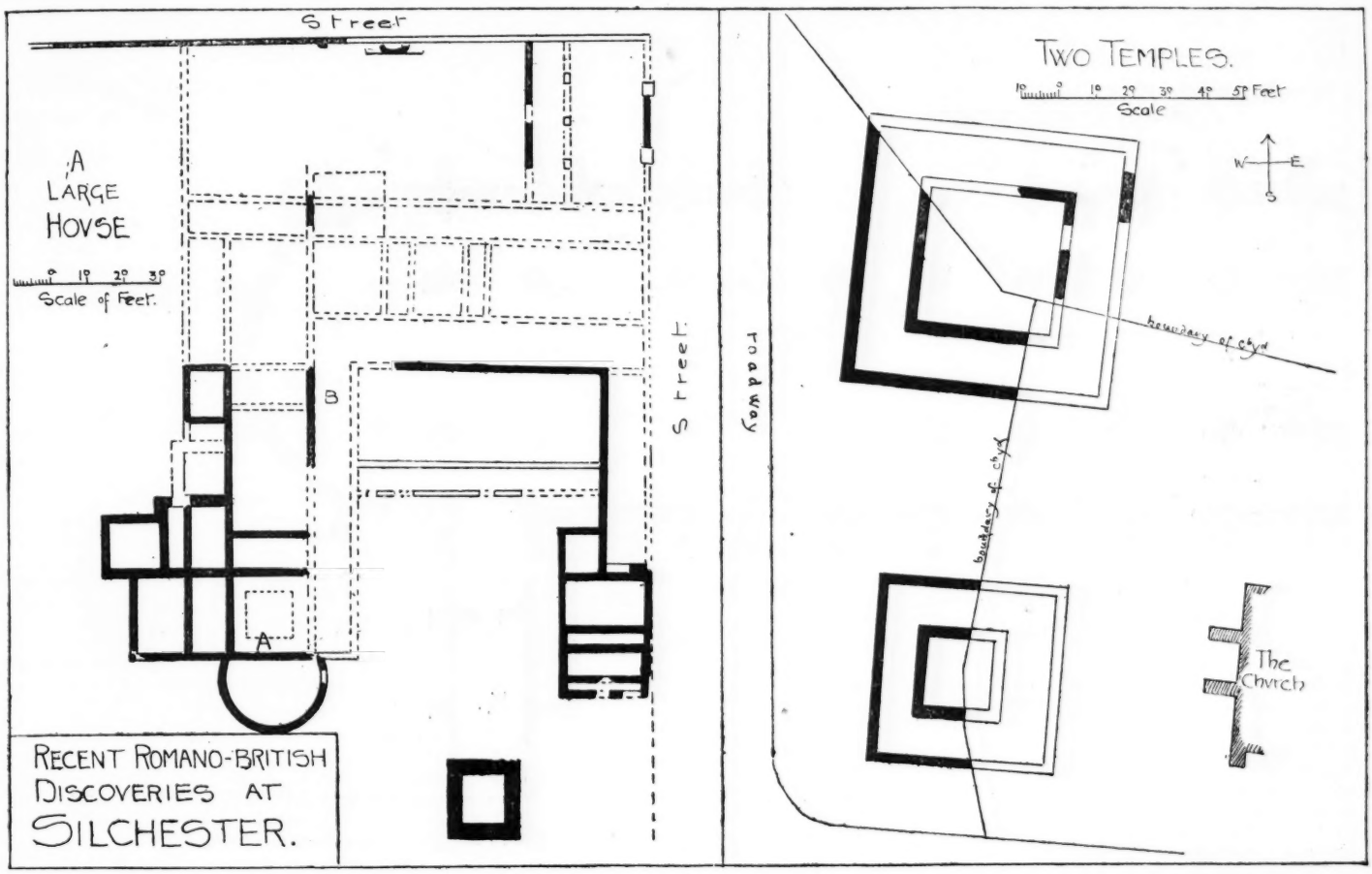
"The systematic and regular trenching of the area north of the highway, and between it and the houses, brought to light several interesting facts.

One is that the ground between and south of both houses was entirely free from buildings, and in part was perhaps used as gardens.

South of the houses the trenches disclosed a whole series of refuse-pits. These were all cleared out, and found to be of no great depth. Their contents were carefully examined, and consisted chiefly of dry rubbish, with potsherds, bones, &c., and occasional coins, objects of bronze, and fragments of glass vessels. A similar variety of objects was also found in the trenches."

A very large Doric column is also shown, which was found at the south gate. It did not belong to the gate, but was brought, perhaps for sale, from some large building in the city. The original is exhibited in the Society's hall, and a cast of it, with the broken parts restored, forms part of the Exhibition. Its imposing size and character show the importance of the building of which it formed part; the site of this has yet to be discovered.

Besides the house, two temples were also found (of which we also give plans) on the eastern side of the site, and close to the parish church, which stands just within the boundary of the city walls. It is somewhat remarkable that the lines of the church are parallel with those of the temples, and not with those of the road, and it seems probable that the church was built on the site of a Roman temple, and perhaps some of the original work was used in its construction. The portions of walls black show the extent of the foundations of the temples which have been followed up to the boundary wall of the churchyard. Amongst the many objects of interest now on view in the Society's room are two specimens of *opus signinum*. One, composed of bits of brick and pink concrete, formed a portion of the platform on which the temple stood. The other, of finer texture, composed of fragments of Purbeck, brick, &c., ground down to a smooth level surface, formed the floor of the building itself. Some of the Purbeck marble wall-linings and the red painted wall-plaster, which was used on the *exterior*, have also been found, and can be seen in one of the cases. There are also a large number of tools, some of them remarkable for their good state of preservation, and also a gridiron, tongs, &c. Various pieces of pottery, Samian ware, ordinary black ware, and Mortaria are also in the collection. Very careful plans and diagrams have been placed on the walls, including a large plan of the whole site.



It is proposed to continue these interesting excavations as soon as possible in the present year, so that in a short time we shall probably obtain a very complete idea of the arrangement of a Romano-British city; one, it must be borne in mind, where the life was purely civil, and wherein the military occupation of Britain had no place. As nothing is known of the civil life during the Roman occupation of this country, the value of the results of the excavations is of the utmost importance.

We would remind those who should be interested in these matters, and they will surely be many, that the present exhibition at the Society of Antiquaries will not remain open beyond the middle of next week. This is now a good opportunity for obtaining a good general idea of the site, and hereafter it will be easy to follow the very interesting work as it proceeds.

ARCHITECTURAL SOCIETIES.

MANCHESTER ARCHITECTURAL ASSOCIATION.—The fifth ordinary meeting of this Association for the present session was held at the Athenæum on Tuesday, Mr. T. Chadwick, A.R.I.B.A., President, in the chair. Mr. P. E. Barker, A.R.I.B.A., read a paper on "A Sketching Tour through Belgium," illustrated by views with the oxy-hydrogen lantern. A vote of thanks, proposed by Mr. Davies Colley, seconded by Mr. Hewitt, and supported by Messrs. Oldham Hodgson & Davies, concluded the meeting.

LIVERPOOL ARCHITECTURAL SOCIETY.—At the fourth ordinary meeting of the present session, to be held at the Royal Institution, Colquitt-street, on Monday next, a paper entitled "Slates and Slating" will be read by the President (Mr. T. Mellard Reade, F.R.I.B.A., F.G.S.).

DUNDEE INSTITUTE OF ARCHITECTURE, SCIENCE, AND ART.—At the next meeting of this Institute for the present session, to be held on the 15th inst., a lecture on "Some Architectural and other Notes on Portugal and Spain," will be read by Mr. Campbell Douglas, F.R.I.B.A., Glasgow. The lecture will be illustrated by lime-light views.

PARTNERSHIP DISSOLVED.—We are asked to mention that the partnership between Mr. Arnold Mitchell and Mr. Alfred M. Butler, of 16, Finsbury-circus, has been dissolved by mutual consent. The practice of both members of the firm will be carried on independently at the same address as heretofore.

COMPETITIONS.

PROPOSED EXTENSION OF BARTON UNION WORKHOUSE.—At the meeting of the Barton Board of Guardians, held on the 31st ult. at the Union Workhouse, Green-lane, Patricroft, the Clerk reported the negotiations of the Workhouse Extension Committee with the Local Government Board, with regard to the proposed extension of the workhouse, and the provision of an infectious hospital. Some time ago the Guardians purchased the old mill premises and adjoining property of Messrs. Waddington, in Union-street, which is adjacent to the existing workhouse, at a cost of about 3,500*l.*, of which action the Local Government Board strongly approved. The Workhouse Extension Committee had recently had an interview with Mr. Henley, Poor-law Inspector to the Local Government Board, and other officers of that body. As a result, designs of the proposed extension and new hospital were invited, and it was agreed to make awards to the best three submitted, viz., 1st, 60*l.*; 2nd, 40*l.*; and 3rd, 20*l.* The Committee recommended the adoption of the design marked "Good Administration," which had been awarded first premium. The two other successful designs were marked "Red Cross" (second), and "Union" (third). The Chairman now announced that the architects for the respective designs were—"Good Administration," Messrs. Mangnall & Littlewoods, Manchester; "Red Cross," Messrs. Booth & Chadwick, Manchester; "Union," Messrs. Barker & Ellis, Manchester. The recommendation of the committee was adopted on the motion of Mr. Robinson, seconded by Mr. Berry. According to the *Manchester Examiner*, the adopted design is similar to that of the Burton-on-Trent Union Workhouse, the block system, in accordance with the regulations of the Local Government Board, having been adopted. In reply to a question, the Clerk said the award of 60*l.* to the successful competitor would now be given on account of the architect's commission. The details of the scheme will now be fully gone into by the Guardians, and application will be made to the Local Government Board for borrowing powers to proceed with the work in due course. The accepted design is practically a new building, and will cost to carry out 25,000*l.* to 30,000*l.*

HEAP-BRIDGE CHURCH (NEAR HEYWOOD, LANCASHIRE).—The designs for this church submitted in a limited competition by Mr. John Lowe, architect, Manchester, have been selected by the committee, involving an outlay of about 2,000*l.* The building will be commenced forthwith.

WESTMINSTER ABBEY.

SIR,—The "Blue-book" on Westminster Abbey is of very great interest, but after a careful study of the published plans and evidence the impression produced on my mind is that the scale of the various schemes proposed, and their cost, is out of all proportion to the present need of any addition, while there is a certain space still available for interments and memorials.

Besides, the plans do not appear to illustrate the principle of *growth*, which gives so great a charm and interest to mediæval buildings. In them, contiguity to the high altar being aimed at, the monuments gradually spread from it as the centre outwards, as the more honourable positions became filled up.

Then, again, excepting Mr. Pearson's design for the northern addition, the plans show various forms of halls or chambers, great and small, to which the title "chapel" is given; and a "special service" is, we learn, to be occasionally held in them to carry out the chapel idea, the Burial Service itself being in the Abbey.

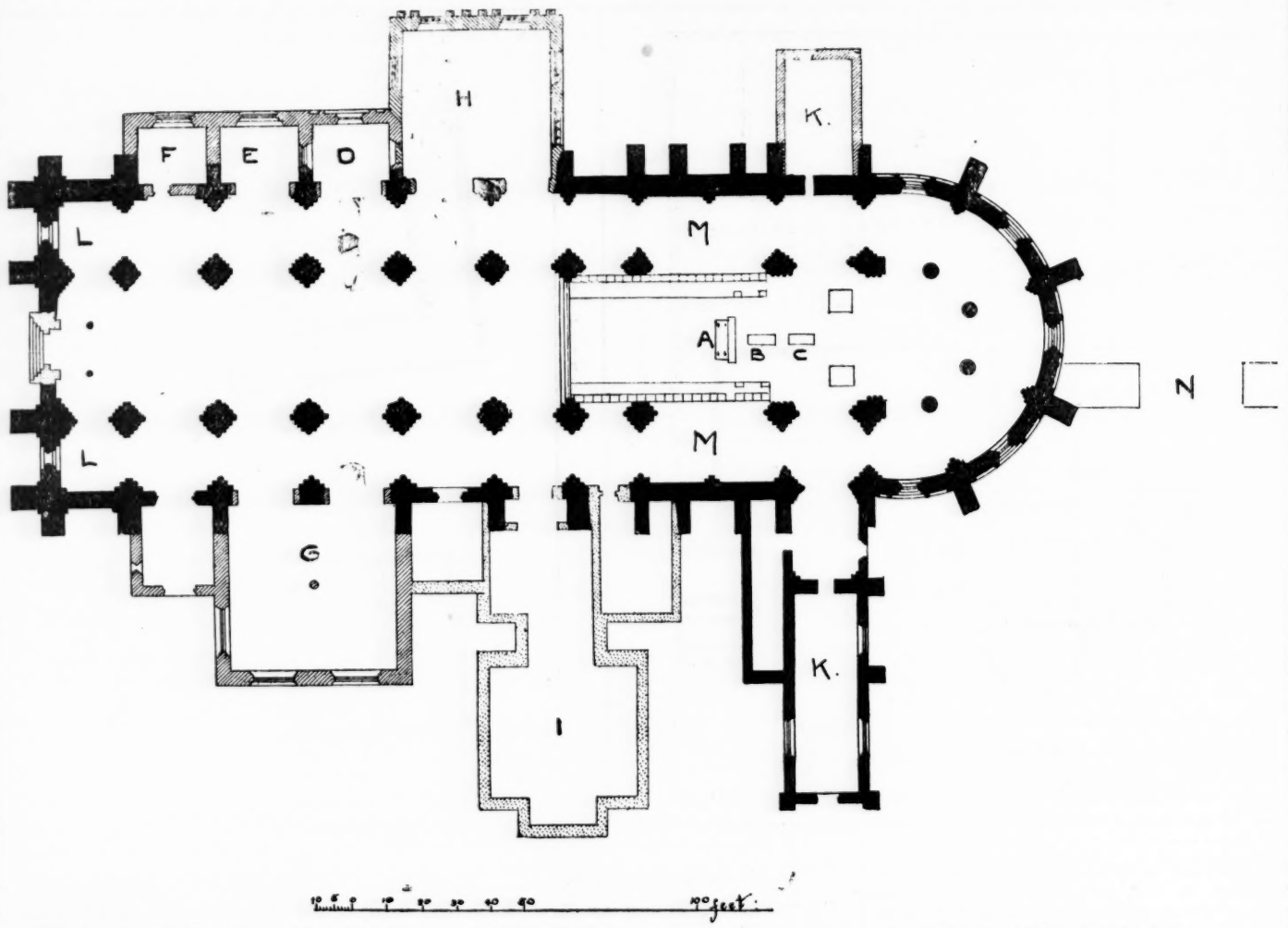
But it is the practical *separation* of these buildings from the church itself which creates this necessity of the special services. It is true that this separation is explained away by the authors as not being an actual one; yet, whatever is done will have to satisfy, not experts or artists only, but general public sentiment. And when the public, more or less ignorant of technicalities, sees two buildings connected by a cloister,—as, for instance, the choir and Lady-chapel of Ely formerly was,—no amount of argument will make them appear, in their view, *one*.

It is this *oneness* of the Abbey which is all-important, and additions manifestly an absolute part of it seem to me to be alone allowable.

The Cathedral of Roëskilde (see plan), the royal burying-place of Denmark, is an example of this oneness, with its many and various additions, not always chapels, some of them being of post-Reformation date, without altars. All of them form one unmistakable whole, and, with the exception of the most modern one, are actually part and parcel of the church.

I venture, to suggest, therefore, an alternative to the north aisle plan prepared by the architect to the Abbey, as shown by the sketch. It is proposed to be on a comparatively small scale, but yet of sufficiently dignified proportions for the purpose.

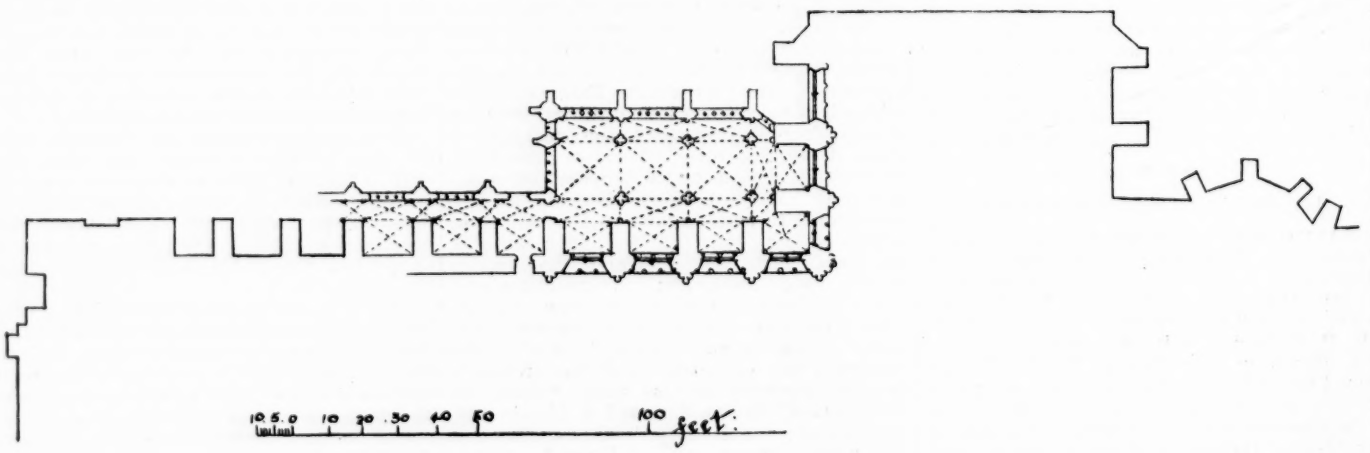
A chapel in the re-entering angle of transept and nave,—or choir,—is so common a



■ Denotes church of the twelfth and thirteenth centuries.
//// Denotes additions of the fourteenth and fifteenth centuries.
\\\\ Denotes additions of the sixteenth century.
:::: Denotes modern additions.

A. High Altar.
B. Queen Margaret's Tomb.
C. King Valdemar's Tomb.
D. Chapel of S. Lawrence.
E. Chapel of S. Brigitta.
F. Chapel of St. Mary Magdalene.
G. Chapel of King Christian I.
H. Chapel of King Christian IV.
I. Royal Chapel.
K K. Sacristies.
L L. Towers.
M M. Transepts.
N. Arched passage to Palace.

Plan of Cathedral of Roëskilde.



Suggestion for Addition to Westminster Abbey : By Mr. R. H. Carpenter.

eature of Mediæval cathedrals,—for instance, Canterbury, Rochester, and Chichester,—that there is ample precedent for an addition there at Westminster in the same or another style, and we cannot but agree that in the instances given there is a distinct gain to the architectural effect of the church without interference with its original proportions.

Of course, there is the great difficulty about a representative style for our day. Mediæval additions with us, and at Roëskilde, together with those there of the sixteenth, seventeenth, an.d eighteenth centuries, all tell their story to us The question is how this difficulty can be best met, and whether it is so insuperable a one that it is better to do nothing at all.

Personally, I would rather see a building of he Decorated style, in the essentially English evelopments of it in Kent or at Ely. The astern cloister openings of Westminster itself prove that the former will harmonise with the work of Henry III., while no one could call Alan de Walsingham's work an incongruous addition to the Norman and Early English structure.

This style, moreover, lends itself to the large windows necessary for lighting monuments, while its delicacy of proportion would contrast, as it does at Ely, with the massiveness of the other without injury to either.

In such an addition, no altar nor title of "Chapel" is necessary to impress the fact of its being a part of the building, while the, to my mind, admirable suggestion of the *Builder*, of the opening of the windows through—and, perhaps, some of the wall arcade also—will sufficiently connect it with the interior.

The style has this advantage, too, that the roof-pitch, as in the Ely Lady Chapel, can be kept low, so that the triforium parapet and pinnacles of the aisle would be visible above it, and dignity of proportion obtained without unnecessary height.

But after reviewing the whole subject may we not fairly assume that posterity will scarcely thank us for altering so materially the effect of the Abbey by adding to it for their benefit a large building in a style with which they may have no sympathy? If anything must be done at once, why not be content with providing for the probable wants of our own generation?

R. HERBERT CARPENTER, F S.A.

BUSINESS CHANGE.—Mr. John Chatterton, of Bridge Wharf, Caledonian-road, announces that he has disposed of his business as a lead merchant and manufacturer, to his brother, Mr. Geo. J. Chatterton, who will carry on the business at the same address.

Illustrations.

PROPOSED CHURCH OF THE GOOD SHEPHERD, HAMPSTEAD.

THIS church is about to be erected at Hampstead, near the Gospel Oak Station. The accommodation is for 1,600 people, all on the ground floor. The materials are red brick with stone bands and strings; the interior is to be of stone ashlar. The church is to be groined throughout in stone, the groins springing from the shafts, as shown, without caps. The estimated cost is 16,000*l.* The architect is Mr. James Brooks.

DETAILS FROM THE CHOIR STALLS, AMIENS CATHEDRAL.

THE sketches of detail from these stalls were drawn actual size, and have only been slightly reduced in the reproduction.

As an example of the carver's art the work is unsurpassed both for beauty and spirit of design, and in delicacy of execution. All the old Biblical stories are illustrated with a power and imagination which is astonishing. The sculptures afford endless material for the student's sketch book.

The work is late fifteenth or early sixteenth century, and was executed under the superintendence of one man, Jhan Thrufin, with the help of seven or eight assistants, taking fourteen years' continuous labour to complete.

A. M.

DESIGN FOR THEATRE DECORATION.

THIS is a design by Mr. J. Parlby for the decoration, in Louis Quinze style, for a theatre of a size to seat about 2,000 persons, having three balconies in the form of elongated ovals, and eighteen private boxes. The ceiling is an irregular hexagon in shape.

MAIDA-VALE MANSIONS.

THIS block of flats is now being erected on the Paddington estate, at the corner of Maida-vale and Blomfield-road. The building is separated into two distinct blocks, one of which will have its entrance from the carriage approach in Maida-vale, and the other from the entrance porch in Blomfield-road, which will be considerably widened by a strip of ground to be given up for the purpose.

On every floor there will be four flats, two in each block, containing from six to nine rooms each, which have been grouped, as far as practicable, into three separate departments for living rooms, bedrooms, and kitchens, with their minor offices; four tradesmen's lifts will be supplied to serve the kitchens of each flat.

The staircases are of ample width, the stairs formed of iron and concrete, and finished in marble. The floors throughout will be fireproof.

The elevations are being carried out in red bricks, with stout string-courses and dressings; the roof to be covered with slate. The contractor for the works is Mr. T. L. Green, of Eagle-street, Holborn, and the architects are Messrs. Boehmer & Gibbs.

THE ENGLISH IRON TRADE IN 1890.

JUST as 1889 surpassed the favourable anticipations formed as to the prosperity of the iron trade when that year was entered, so the year of which we have just seen the last has disappointed the hopes entertained at its commencement. Opening in the full flow of prosperity, with prices high and orders plentiful, 1890 closed with depression in almost all branches of the iron trade. The year cannot be described by a better term than phenomenal, as it has been one of the most eventful since the period of 1871-72. While the fall in the price of pig-iron, for instance, has been equal to a reduction of about 30 per cent., labour connected with its production has succeeded in obtaining advances ranging from 30 to 40 per cent. during the past twelve months. The causes of this abnormal condition are not far to seek. The complete organisation with which labour movements are now conducted explains the success of the workmen. On the other hand, there were many influences at work which could not but tend to bring prices down. Amongst these may be mentioned the disturbed condition of two countries of South America, Brazil and the Argentine Republic, closing them against us for a time; the further development of the protective policy of the United States by the passing of the McKinley Tariff Bill; and the great financial troubles in the City in November. All these events have tended, directly or indirectly, to retard business, and to check that inflow of orders which a growing consumption would lead us to anticipate. At the same time the trade done during the year, taken as a whole, has not been far below that of 1889.

We need but refer to that standard of British trade, the Board of Trade Returns, in order to justify this assertion. The foreign shipments of iron and steel during last year amounted to 4,001,579 tons, compared with 4,186,182 tons in 1889. While the exports of 1890 show a decline of 185,000 tons, it is satisfactory to find that the value of those shipments exhibited a gain of nearly 2,500,000*l.*, being 29,142,129*l.* for 1889, against 31,582,172*l.* in 1890. This clearly demonstrates that better prices were obtained in the latter than in the former year, although it must be admitted that much of the increased value shown in 1890 was the result of the high prices at which materials were contracted for at the end of 1889, and that the rates which ruled at the beginning of 1890 have been greatly reduced during the year.

Glasgow pig-iron warrants opened the year at 64s., but by the end of January they had lost as much as 7s. 6d. a ton. Scotch iron continued to droop until it was 43s. 4d. in June,—the lowest price of the year,—when it ascended again to 54s. in October. The subsequent financial disturbances, however, unsettled the market, and caused the depression to which we have referred, notwithstanding the fact that stocks in Connal's stores at Glasgow decreased steadily during the year, standing at 613,445 tons on December 31, 1890, against 1,035,840 tons on December 31, 1889. This is a very remarkable fact. Equally so is the circumstance in connexion with the Scotch pig-iron trade, that, although nearly all the Scotch blast-furnaces have been closed for the last three months owing to a wages dispute with the furnacemen, this has not had the least effect on the resuscitation of prices, which have given way almost the whole time. But they were at the close of the year not so low as at Midsummer, the last cash quotation of the year for Scotch warrants being 46s. 3d. This shows a decline of 18s. over the year. Cleveland pig-iron No. 3 began the year at 65s. It descended to 40s. in June, reascended to 50s. in October, and is now 42s., or 23s. less than in January last. In that case there has been only a small reduction in stocks, the stocks at the end of 1890 being 256,262 tons, against 262,385 tons at the close of 1889. While stocks in warrant stores showed a considerable decline, this was counterbalanced by an equally large increase in the stocks held by Cleveland makers. The production of Cleveland pig last year was 2,846,089 tons, compared with 2,771,181 tons in 1889, and 2,614,983 tons in 1888. Owing to the strike of the blast-furnacemen, the output of pig-iron in Scotland has been but 798,333 tons, the lowest production for thirty years. Although the stocks of hematite iron in the north-west of England decreased by close upon 170,000 tons, and makers have been doing a steady trade throughout the year, prices shared in the general depreciation. Hematite warrants were quoted 82s. 10½d. and mixed numbers of Bessemer iron 82s. in the middle of January, but by June the latter had dropped to 50s. 6d., and are now 53s. 6d; the fall for the year amounting to 29s. per ton. In the other pig-iron making districts the decrease in prices has been as considerable. In Lancashire, the drop has been from 72s. 6d. (the lowest-priced brand) to 50s., or 22s. 6d. per ton; Lincolnshire forge, from 74s. to 47s., or 37s.; Derbyshire foundry, from 78s. to 50s., or 28s. In all those districts the output was very regularly maintained until the general depression caused a withholding of orders, which almost led to a general scramble for them.

It is but natural to expect that the prevailing depression of prices of crude iron was followed by a corresponding decline in the values of the finished product, and this notwithstanding the fact that, as a rule, and for the better part of the year, the output and shipments have not decreased to a degree which would justify the low prices now ruling. In Scotland, bar iron fell from 8*l.* to 6*l.* 10s. In the north of England, common bars and ship plates receded from 8*l.* to 5*l.* 17s. 6d. In Lancashire, makers were able to obtain 8*l.* 10s. to 8*l.* 12s. 6d. for bars in January, but were glad to secure orders in December at 6*l.* 5s. and 6*l.* 7s. 6d. Welsh bars have dropped from 8*l.* 7s. 6d. to 6*l.* 7s. 6d. Marked bars were sold in January in Staffordshire at 9*l.* 10s., but they are now pretty firm at 8*l.* 10s., while the prices of black sheets (singles) were 10*l.* 5s. and 7*l.* 10s. respectively, the great drop in this class of manufactured iron being in a large degree due to the inability on the part of the Sheet Makers' Association of maintaining official quotations in a falling market. In the hardware trade, although employment has been pretty regular, and wages have been higher, operations have been frequently interrupted by disputes to which both sides contributed their share, with the result that the men have been able to greatly strengthen their position. Tinplate makers, both masters and men, have been doing well during the year, which has been a prosperous one to them, and prices closed the year at a higher level than they occupied at its beginning. American buyers at one time tried to depress the market; but, pending the passage of the McKinley Tariff Bill, they had to purchase, *nolens volens*, to be provided against all emergencies, and the consequence was the placing of large orders ahead, which will keep the tinplate makers employed for some time. Prices of plates are now from 1s. 6d. to 2s. 6d. per box higher than they were last January.

It is not too much to say that, although the reduction in prices of steel has been considerable, the trade done by steelmakers during 1890 cannot be much below that of the previous year. There has never been, to our knowledge, absolute want of work, and in some departments, notably the special branches of steel manufacture in Sheffield and Leeds, mills and forges have been carrying on operations to their fullest capacity. In the north-west of England there has been no interruption to the prevailing activity. The consumption of steel has been large both in Scotland and the north of England, more particularly by shipbuilders. There have been considerable fluctuations in steel in Lancashire, both as to demand and prices. Boiler-making qualities of steel plates sold in Lancashire last January at the inflated price of £12; they can now be bought at 8*l.* and under! The difference in price at the beginning and close of the year in other districts was not quite so glaring; still, it was considerable. Steel ship plates, for instance, receded from 8*l.* 15s. to 6*l.* 10s. in the north-west, from 10*l.* to 7*l.* 2s. 6d. in Scotland, and from 9*l.* to 7*l.* in the north of England. There was also a heavy drop in rails, heavy sections declining from 7*l.* 10s. to 4*l.* 17s. 6d. in the north-west, and from 7*l.* to 4*l.* 17s. 6d. in the north. Tinplate bars, a very important article of manufacture, have not suffered so much, the respective prices being 7*l.* 10s. and 6*l.* Notwithstanding this drawback with regard to rates, however, it cannot be denied that the demand for steel is growing, and that steelmakers, to meet the increased inquiry, will have to add to their plant.

The year's shipbuilding returns are satisfactory. Although there is a decrease compared with 1889, the tonnage launched in 1890 being 1,302,055, against 1,346,516 tons in the previous year, this is but a slight diminution in the output in face of the large totals. The tonnage launched in 1890 is the second largest within ten years, and is nearly three times that of the year of lowest production within that period, namely, 1886, when only 474,000 tons were put into the water. The tonnage still in hand is considerably less than at the close of 1889, being about 700,000 tons, while the tonnage building in January last represented nearly 900,000. Engineers can look back upon 1890 with even more satisfaction than shipbuilders, or, indeed, any other department of the iron trade. They have been busy throughout the past year, and commence the new year well off for orders, the busiest branches of the trade being those making machine tools and electrical appliances.

With the exception of the strike of shipjoiners in the north-eastern ports, which was most unreasonably prolonged by sheer obstinacy on the part of the operatives, the year has been singularly free from trade disputes in the shipbuilding line. There have been strikes in other departments of the iron trade, but they partook merely of a local character, and did not cause any unsettlement of the trade at large. The engineers in the north-eastern ports also came out for a time. On the whole, however, the relations of capital and labour have been amicable, and much of this satisfactory con-

dition of things is due to a desire on both sides to avoid strikes. The men really have very little cause for disputes, for wages are now as high as they can possibly be, although an early re-adjustment of the rate of payment appears to be inevitable if present low prices continue to rule.

With regard to the prospects of the iron trade in the present year, views differ somewhat. While the outlook at the close of 1890 was slightly disappointing, and contrary to what was expected but six months ago, there is no cause for apprehension. It must always be borne in mind that the requirements of consumers of iron and steel are not decreasing, and that, all the world over, they must be on the increase with the growth of population and the advancement of civilisation. The checks which strikes and financial speculation and subsequent disaster occasionally put upon legitimate trading are, after all, but temporary. The wants of civilised humanity must be met, with the inevitable consequence of an ever growing production. As to the year before us, it is necessary to observe that, as far as human foresight can determine, there is nothing to disturb peace, and, with peace preserved, trade will revive under the silent but potent influences which have been referred to.

THE RIGHTS AND LIABILITIES OF ADJOINING OWNERS WITH REGARD TO HIGHWAYS.

THE SURVEYORS' INSTITUTION.

AT the ordinary general meeting of the Surveyors' Institution, held on Monday evening last, Mr. R. C. Driver, President, in the chair, Mr. L. P. Hodge, Fellow, read a paper on the above-named subject. He said:—

The history of our roads is one of evolution. In mediæval England the insecurity of life and property prevented even the free communication between town and town which characterised the golden age of Elizabeth. But no sooner did the country realise that the Wars of the Roses had rid it, by a process of exhaustion, both of the feudal system and the grinding tyranny of the old nobility, than a change at once took place. Towns and hamlets, hitherto isolated, became alive to the importance of free and rapid intercommunication, labour ceased to be serfdom, and the immigration to the cities, which still figures as a puzzling factor in our national economy, then commenced.

It would naturally be expected that the improvement of the then existing and newly-formed roads would proceed *pari passu* with the increased desire to travel, and so it happened to some extent. The mere tracks across country, in following which it was literally, as well as figuratively, possible to "lose one's way," became permanently defined. In process of time pillions and pack-horses were superseded by stage wagons, and eventually by coaches, necessitating a wider draught; but beyond the extension of width nothing seems to have been attempted to improve the road surfaces.

The highways ran, we are told, straight up hill and down dale, with the most profound contempt for gradients. In bad weather there was generally a slight ridge in the centre between two channels of deep mud. What wonder, then, that it was considered a dangerous feat for the flying coach to leave Oxford at six in the morning and reach London at seven o'clock the same evening? A winter journey from Chester, York, or Exeter to the metropolis took six days, and even as late as 1790 the cotton bales of Manchester were carried to Bristol on pack-horses. Nor was the population of the country sufficiently spread over its surface to insure a good demand for properly-constructed roads. The revolution of 1688 found more than half England consisting of moorland, forest, and fen, while vast commons and wastes covered the greater part north of the Humber.

But the tranquillity which attended the Protestant succession, and the numerous Enclosure Acts passed in the reigns of George the II. and III., soon effected vast changes in the face of the country.

Scotland, too, shared in the general improvement, though from somewhat different causes. Upon the collapse of the Chevalier's last effort, in 1745, to regain the throne of his ancestors, the Government became alive to the importance of good roads as agents in the pacification and development of the Highlands, and the highways constructed by them for strategic purposes drew from one fervent admirer (possibly of Hibernian extraction) the warm encomium:—

"If you'd seen these roads *before they were made*,
You'd hold up your hands and bless General Wade,"

he being the officer in command of the troops charged with the execution of the work.

It is, however, to the formation of the Turnpike Trusts that we owe more than anything else the vast improvements which have taken place in our roads during comparatively late years.

I have dealt somewhat fully with the gradual evolution of roads, as it materially assists to explain the *rationale* of the various common law rights and liabilities which we now propose to pass on to consider.

In the case of an ancient highway formed, as most roads were originally, through an unenclosed country, the lord of the manor would contribute the soil, which, subject to the use by the public of the surface, would still vest in him. In process of time, the lord's copyholders would commence to enclose land against each other, and against the road. If the lord granted them the land up to the roadway, it would make no difference whether they enclosed to the full extent of their grant, or left a certain amount of waste comprised in their grant outside their fence, and adjoining the roadway. Such waste would be the copyholders' property.

If the lord did *not* grant the land up to the roadway, but reserved a strip of land adjoining the latter, such waste, as well as the roadway, would be his property.

This common law axiom would apply only to roads made through an unenclosed country.

Now, passing on to consider roads formed in an enclosed country, the *copyholders* would, in this case, contribute the land which would remain vested in them, likewise subject to the public rights as in the first instance.

These operations are supposed to have taken place in the remote past, in fact, before the time of legal memory, which is an exceptionally good one, and can be trusted as far back as the reign of Richard II., where a lay mind would be hopelessly unreliable, and it is upon the assumptions just laid down that the common law as it affects owners of land contiguous to highways, is based.

In the absence of evidence to the contrary it is assumed that the land upon which any highway has been formed belongs to the adjoining owners, and that each contributed the use of his ground *usque ad medium filum viæ*.

Land not being then of much value, and the part of the highway actually used being of a fluctuating width, according to the seasons, the owners would generally, in enclosing against the road, set back their fence to leave more than the minimum width, and the surplusage, or "waste," as it is technically called, would be still deemed their property.

The existence of these wastes is, however, more fully accounted for by Lord Chief Justice Tenterden, whose explanation of them I will quote at length:—

"In remote and ancient times, when roads were frequently made through unenclosed lands, and they were not formed with that exactness which the exigencies of society now require, it was part of the law that the public, where the road was out of repair, might pass along the land by the side of the road.

"This right on the part of the public was attended with this consequence, that although the parishioners were bound to the repair of the road, yet, if an owner excluded the public from using the adjoining land, he cast upon himself the onus of repairing the road. If the same person was the owner of the land on both sides, and enclosed both sides, he was bound to repair the whole of the road; if he enclosed on one side only, the other being left open, he was bound to repair to the middle of the road; and where there was an ancient enclosure on one side, and the owner of lands enclosed on the other, he was bound to repair the whole. Hence it followed, as a natural consequence, that when a person enclosed his land from the road, he did not make his fence close to the road, but left an open space at the side of the road to be used by the public when occasion required. This appears to be the most natural and satisfactory mode of explaining the frequency of wastes left at the sides of roads; the object was to leave a sufficiency of land by the side of a road when it was out of repair."

It would seem, therefore, that if any owner encloses against the actual roadway and neglects to keep it in repair, it would be lawful for any travellers to trespass on his property, provided that they travel not into it further than is necessary in the exercise of their right.

This permission would, however, only apply in the case of public roads.

The right to use a private road is strictly an easement, and the person using it ought himself to do the necessary repairs, so as to impose no greater burden upon the grantor than that contemplated at the time of the grant.

Beside, a private right of way is generally restricted to a particular line of road, with fixed ingress and egress, and the grantee would have no right to diverge therefrom, nor to leave it at any point not specified in his grant.

There are three exceptions to the common law obligation to repair *ratione clausulæ*:—

1. That where the enclosure is made by virtue of an Enclosure Act the adjoining owner is not liable to repair, unless in pursuance of such Act.

2. That in the case of building roads and others of modern construction, where only the portion actually formed would be presumed to be dedicated, the adjoining owner may build up to the roadway so formed without incurring any liability save that imposed by statute; and

3. Following from this, that where enclosed land has not been used as a public highway before enclosure the public rights are limited to the extent of the roadway so enclosed.

Any owner can rid himself of the liability to repair *ratione clausulæ*, by throwing open his land to the highway as before, but it may be worth while to point out that by so doing he would not evade his obligation to contribute towards the widening or diversion of the road under the powers of the Public Health or various Highway Acts.

The common law obligations and rights are based, as I have endeavoured to show, only upon presumption, which may be rebutted by evidence that the grantee *did* enclose to the full extent of his grant, in which case the rights and duties of the adjoining owner would vest in the lord of the manor, as first stated.

In the absence of direct evidence the lord must prove acts of ownership in support of his contention, which need not necessarily be exercised over the precise spot in dispute, provided that the places between which such acts can be proved are parts of the same common or waste.

I have been somewhat particular in setting out the principles which govern the ownership of the soil and waste land adjoining highways, as from the number of queries which are constantly appearing in the professional journals, and this Institution's own "Professional Notes," it would seem that the historical theory upon which the common law with regard to highways is based, is not always clearly understood.

In all cases where the public claim a common law right, it must be remembered that the width of road over which it is claimed must always be somewhat undefined, as the public rights extend only over the ground actually used, and are limited solely to the surface.

The soil of the road, with the mines and minerals, and the waste land and trees at the sides, remain, as we have seen, the property of the adjoining owners *usque ad medium filum viæ*, and if from any cause, such as a diversion, the public ceases to use the highway, the adjoining owner can resume absolute possession of the same.

If any proof be needed that the subsoil of a road remains absolutely private property, and that the surface belongs also to the owner of the land upon which the road has been made, it will only be necessary to refer for a moment to the ruling in "Regina *v.* Pratt," where it was held:—

"That if a person stand on a highway (the land on both sides of which belongs to B), and by sending a dog into a cover adjoining puts up a pheasant, which he shoots as it flies across the road, he is guilty of trespassing upon the land of B (*viz.*, *the highway*) in pursuit of game, because he is there not merely in the exercise of his right to travel upon it, but for another and a different purpose."

Another point of interest to lessees and owners of building land is that no person can dedicate a road to the public, save the owner in fee, and where lessees for ninety-nine years allowed a road to be used as a public thoroughfare for the whole term, the Court held that the freeholder was able at the expiration of the lease to close the road by erecting a fence across it.

I did not intend, when commencing this paper, to trespass into other professional domains by quoting case-law, but the two cases just mentioned so fully bear out the statement of common law rights, that I am unable to refrain from noticing them.

In these days of Highway Boards and local vigilance the enclosure of waste land next public roads had best be let alone, as it seems of questionable legality.

"If it were once held" [said Lord Tenterden, C.J.] "that only the middle part, which carriages ordinarily run upon, was the road, you might by degrees enclose up to it, so that there would not be room left for two carriages to pass. The space at the sides is also necessary to afford the benefit of air and sun. If trees and

hedges might be brought close to the part actually used as the road it could not be kept sound." (Regina v. Wright.)

The wording of the 1st Sub-section of Section 11 of the Local Government Act of 1888 is also significant of the attitude which the County Councils may be expected to take, but I shall refer to that more fully when considering that Act.

The Rights and Duties of Adjoining Owners as Conferred and Imposed by Statute.

The statutes relating to highways are so many in number, and so well understood, that it will be impossible to do more than glance at the various Acts as they extend or limit the operation of the common law.

The first Act which we need consider is the Highway Act of 1835, which provides that each parish shall elect a surveyor of highways, who is to fix direction-posts, place graduated stones or posts where the road is subject to floods, secure the causeways, remove snow or slips, keep accounts, and levy a rate upon all property ratable for poor or highway rate.

In large parishes with a population of 5,000 the Vestry may, by a two-thirds majority, elect any number of persons, not exceeding twenty nor less than five, to form a highway board to discharge the duties which would otherwise devolve upon one surveyor.

For the purposes of this paper the Acts of 1862 and 1864 may be deemed one with the Act just summarised, and adjoining owners were affected by their operation principally as follows:—

1. If liable to repair the highway *ratione tenuræ* they may under section 6 of the Act of 1835 transfer their liability to the parish by paying either an annual or capitalised amount as determined by the Highway Act, 1862, section 35, or the Act of 1864, section 24.

Until 1890 it seems never to have been definitely decided whether the owner or occupier is liable to repair *ratione tenuræ*, but the decision in the case of "The Queen *v.* Barker," reported in Vol. IV., part 3, of "Professional Notes," seems to affirm that it is the occupier who is liable.

2. If liable to repair *ratione clausulæ* (which liability attaches to the occupier and not the owner), the latter may, as we have seen under the common law, find the public trespassing upon his property, should he suffer the roadway to become impassable. But, under this Act, Section 46, the owner may, with the consent of the highway board, if in a highway district, or of the surveyor in other cases, erect fences between his land and the roadway without incurring any liability to repair the roadway as a consequence of so doing.

The Act of 1855 has defined the minimum widths at which the various classes of highways are to be maintained as follows:—

Carriage or cartway, minimum width, 20 ft.
Horseways ,, ,, 8 ft.

Footpaths can only be constructed with the consent of the vestry, and their minimum width is defined as 2 ft.

Whilst considering the minimum widths, I must point out, as probably many members here present have had to do when acting for adjoining owners, that section 80 of the Act of 1835 only compels the surveyor to maintain the clear width of 20 ft. where the space between the road fences will allow of this being done without infringing upon the rights of such adjoining owners.

Where the latter have enclosed against the road the fence and ditch belong to them absolutely, the public roadway extending only to the toe of the ditch.

Any paring away, therefore, of banks or curtailment of ditches can only be done with the consent of the adjoining owners, and if such consent be refused Section 82 of the Act empowers the authority to take the extra ground required, and to compensate the owners, subject to certain restrictions with regard to mines and minerals, timber, &c., which remain still vested in the owners of the fee.

The powers conferred under this Act do not extend to the pulling down of houses, or the compulsory acquisition of gardens, parks, or nursery ground.

If an adjoining owner wishes to put a gate across a highway the Act imposes a minimum opening of 10 ft. for a cartway and 5 ft. for a horseway.

Under Section 51 the surveyor may dig gravel from waste lands, rivers, or brooks without payment, but if sufficient material cannot be obtained from those sources he may give one month's notice to the occupier of any enclosed land (not being a garden) in that or the adjoining parish, to appear before the justices and show cause why gravel should not be dug from such land. The surveyor is to offer compensation and to make good any incidental damage, and the justices may make an order and determine the compensation to be so paid.

The Acts of 1835, 1862, and 1864 all contain clauses compelling the adjoining owners to repair the highway where liable *ratione tenuræ*, unless they prefer to compound with the highway authorities for an annual or capitalised sum to be paid in lieu of the discharge of their obligation.

There are a few nuisances both at common law and by statute for which adjoining owners are liable which it will be convenient to consider under one head.

Nuisances at Common Law.

Where a road has been enclosed the public are entitled to the full use of the width between the fences, and even telegraph poles placed on the waste at the side of the road have been held to be nuisances, and the owners compelled to remove them. Telephone poles, erected without Parliamentary powers, would, of course, be equally indictable.

Adjoining owners may also be proceeded against for allowing their ditches to become so foul as to injure the road by not allowing the surface water to run freely away. They may likewise be summoned for allowing their trees or underwood to overhang to such an extent as to impede the traffic of the highway.

An adjoining owner cannot, without obtaining an Act of Parliament, authorise the taking up of the pavement in order to lay a service-pipe or drain to or from his house, even though, as we have seen, the ground upon which the pavement is laid might be his own property.

Fortunately, however, for Members of Parliament, who would otherwise be inundated with private Bills, adjoining owners are not often required to go to this expense, as the various public companies, who have so kindly undertaken to supply the necessities of modern existence at a profit, have obtained legislative powers, enabling them to open up the ground upon payment of a fee.

The public can only take a highway upon the terms granted them, and as between themselves and the adjoining owners they use the way subject to incidental risks. But such owners are liable for accidents arising from negligence or their own acts, and are not only open to civil action, but even to criminal prosecution.

Thus, a person who turned out a horse upon a common with an unenclosed public footpath, so that a child was killed by a kick of the horse, underwent trial for manslaughter, and was found guilty.

Also, if an adjoining owner excavate so near the highway as to endanger the public, or negligently blasts stone, he runs the risk of a criminal prosecution.

Any person has a common law right to remove an obstruction to a highway, but must show his necessity for travelling over the portion obstructed ("Dimes *v.* Petley").

Nuisances under Statute.

In considering nuisances under statute, it will be sufficient, I think, to summarise the sections of the various Acts defining them.

Section 64 of the Act of 1835 enacts that no tree can be planted within 15 ft. of the centre of any highway.

Section 65 provides that if any adjoining owner neglects to trim his hedges and trees, to the detriment of the highway, he may be summoned before the justices, who may make an order compelling him to do what is necessary within ten days. If such order be not complied with within that time the surveyor may trim the hedges and trees himself and recover the cost.

The order served upon the owner must not be a vague and general one, but must specify what is to be done, and the particular trees or hedges requiring attention, in such a manner as to leave him in no doubt as to the precise manner in which it is meant to be complied with.

This section merely extends the common law obligation which makes the obstruction of a highway by overhanging trees a matter for indictment, but with this difference, that whereas the injury was at common law one sustained by the public, under this section it would be sufficient if only the roadway itself suffered in consequence of the hedges or timber not being properly looked after.

We have already noticed that under the common law adjoining owners could be indicted for allowing their ditches to become foul and so injure the highway.

Section 67 of the Act of 1835 gives to the surveyor power to make, scour, cleanse, and keep open all ditches adjoining any highway, and would, apparently, operate to release the adjoining owners from their common law obligations.

The law officers of the Crown have, however, held (29 J. P. 319) that this section merely empowers, *but does not compel*, the surveyor to cleanse the ditches more effectually than the adjoining owners could be compelled to do.

When such ditches have been so treated by the surveyor it would appear that, under Section 68, they are henceforth under his control, and the adjoining owner is liable for any damage arising from his (the owner's) interference with them.

It is, therefore, worth while for professional men, when acting as agents for adjoining owners, to consider each question of this sort upon its merits, as it is not desirable always to evade one's common law liability at the cost of losing the control of one's ditches.

The law officers of the Crown have, moreover, advised that, to prevent disputes, the surveyors should give notice to the adjoining owners to cleanse the ditches, and should not exercise their powers under this section unless such notice be not complied with.

They also consider that any materials removed under this clause are the property of the adjoining owner, if claimed by him.

Any encroachment by an adjoining owner upon a highway is a public nuisance, and indictable as a misdemeanour. No length of time will legalise it or prevent the public from gaining possession of its site. Such encroachment must, however, be appreciable.

Before passing on to consider additional restrictions imposed by statute upon adjoining owners rather than private persons, there is one point which seems to lack a recorded decision, and upon which other members of this Institution may share my desire for fuller information. In the event of a landslip occurring, by which the soil of an adjoining owner is carried over into the highway, who is liable to remove the soil and repair the road and ditch? If it be the Highway Board, as I suppose, is the soil, as in the case of that removed from ditches, the property of the adjoining owner, and if it be replaced upon his land, is he liable for any costs incurred beyond his contribution as a ratepayer?

Perhaps some gentlemen here who have dealt with a case of this description may be able to throw more light upon these points.

Having now briefly summarised the duties and liabilities of a private adjoining owner under statute, I will conclude by noticing certain exceptional obligations which the law imposes upon railway companies when crossing highways.

By 2 & 3 Vic., cap. 45, railway companies must maintain gates, with a suitable person to open and shut them, across each end of any turnpike or other road. * * *

The Railway Clauses Consolidation Act, Section 11, enacts that no undue deviation from the authorised levels shall be made affecting any street or public highway without the consent of two justices.

Subject, however, to the restrictions imposed by this section, or the special Act, or any Act incorporated therewith, the company may generally alter and divert roads.

The word "conveniently," in section 16, which confers this general power, has been held to mean conveniently both for the company and the public, and "where a company have *bonâ fide*, although acting *ultra vires*, diverted a road with a view to public convenience, a court will not compel them to construct the road *intra vires*, if the result would be a great inconvenience to the public."

Section 46 deals with bridges over and under public roads.

Upon this section it will be sufficient to observe that where a railway crosses a highway otherwise than on a level, and the special Act is silent, the company may carry the road over the railway, or *vice versâ* (R. *v.* S.E R., 17 Q.B.D. 485), where the highway is carried over the railway, the company are perpetually liable to repair the bridge and its approaches ("N.S. Railway Company *v.* Dale").

But where the highway is lowered for the railway to be carried over it by means of a bridge, the Company is not bound to repair the highway under the bridge, but the repair of such highway is still thrown upon the parish ("L. & N. W. Ry. Company *v.* Skerton").

The remaining sections from 49 to 58 of the Railway Clauses Consolidation Act deal minutely with the minimum levels, gradients, and widths of bridges carrying railways over highways and *vice versâ*, and, although technically interesting to railway men, are not of general interest.

This paper would be incomplete without some reference to the Public Health Act, which deals exhaustively with the regulation and construction of roads and streets.

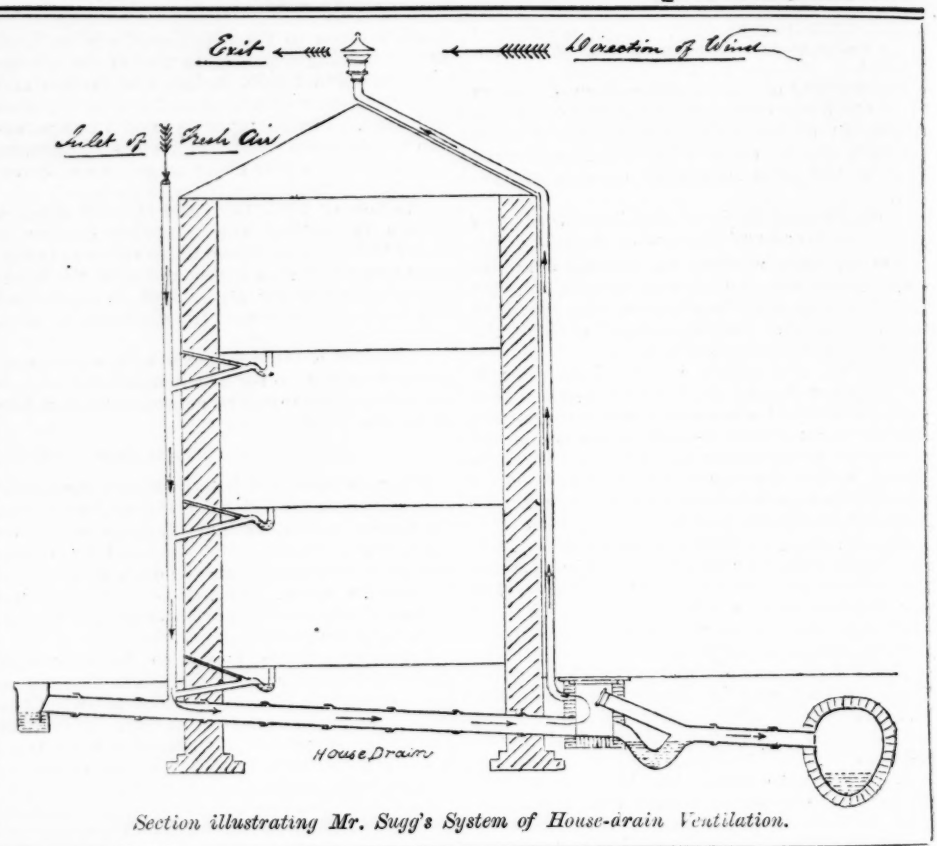
But we are all generally acquainted with the provisions of this most important Act, and those of us who have sat for the Fellowship Examination appreciate the wisdom of the Council in requiring all candidates in the building section to show their knowledge of its leading provisions.

I must also notice another recent and important Act. I refer, of course, to the Local Government Act of 1888, which transfers to the County Councils, thereby appointed, the entire maintenance of all main roads within the meaning of the Highways and Locomotives Amendment Act, 1878, inclusive of all bridges carrying the same, if repairable, by the highway authority. Section 2 of this Act of 1888 relates exclusively to the maintenance of main roads. * * *

As far as I can ascertain from carefully following the law reports, no important decision has yet been given under this Act affecting adjoining owners.

There is, however, a recent case arising out of Sections 150 and 160 of the Public Health Act that I should like to mention as affecting the owners of frontage to public footpaths. I refer to "Evans *v.* The Newport Urban Sanitary Authority," decided in February, 1890, by the Court of Queen's Bench, in which it was held where an old footpath repairable by the inhabitants at large was widened, and houses were built abutting upon it, that it was a street within the meaning of the Act, and the frontagers were liable to contribute to the expenses of improving it; and further, that the frontagers were chargeable with the expenses of improving the whole street, and not merely such part of it as had been added to the ancient highway.

After a discussion, in which several members took part, the meeting adjourned.



Section illustrating Mr. Sugg's System of House-drain Ventilation.

Books.

The Comprehensive International Wire Table. Compiled by WILFRED S. BOULT. Liverpool, 1890.

THESE tables have been compiled from various sources, and, though they may not contain any matter of a novel character, they bring together in a useful form information that an electrical engineer or contractor is constantly requiring. The data given fill 452 columns, spreading over fifty-one pages; single wires and cables, varying in diameter from 2·26 in. to 0·001 in., are arranged in consecutive order, according to cross section; and they include the Board of Trade Standard, the Birmingham, the Brown, and Sharpe, and the Metric Gauges. The scope of the information afforded is best seen by reading down a column. The diameter is given in inches and millimètres; the sectional area in square inches, circular millimètres, square centimètres, and circular millimètres; the gauge under the heading weight—lb. per 1,000 ft., ft. per lb., grammes per mètre, mètres per kilogramme; the current at 1,000 ampères per sq. in., 200 ampères per square centimètre, 1,000 circular mils. per ampère; the resistance, in a conductor at 15 deg. C. which has 98 per cent. the conductivity of pure copper—per 1,000 ft. per lb., per kilomètre, per kilogramme; the current that will cause a rise of temperature of 10 deg. C. when insulated conductors are laid in wood casing. The current density is given in ampères per square inch, circular mils. per ampère, ampères per square centimètre; the fall of potential at full load in volts per 1,000 ft. and per kilomètre; finally, the current that will cause a rise in temperature of 5, 10, 20, and 40 deg. C. in a bare overhead wire in calm weather. The parts of the tables dealing with temperature are by no means complete, but as such data can at best be but rough approximations, perhaps the figures given are sufficient for ordinary purposes.

Anyone who has attempted to obtain for his own use figures scattered about in technical papers and the proceedings of learned societies, will know the amount of labour Mr. Boult has spent in collecting these data, and we hope they will be fully appreciated by those for whom they are intended.

The Book of Sundials. Collected by Mrs. ALFRED GATTY. Third and enlarged Edition. Edited by H. K. F. EDEN and ELEANOR LLOYD. With an Appendix on the Construction of Dials, by W. Richardson. (London: George Bell & Sons. 1890.)

As we reviewed this interesting book at some length on the appearance of the second edition last year (see *Builder* for December 21, 1889) it is scarcely necessary for us to do much more now than to mention the appearance of the third edition, which in its *Addenda* gives more than sixty mottoes not contained in the previous edition. Some interesting additions have also been made to the collection of uninscribed dials, one of the most interesting of these early dials being that at Langford Church, Berks. Another interesting specimen is found at Barnack. Both these dials are figured in the present edition of this handsome book, in which, however, some inaccuracies to which we pointed in our review of the second edition have not been corrected.

Barker's Facts and Figures, 1891, edited by Thomas P. Whitaker (London: Frederick Warne & Co.), is a new aspirant for popular favour, which it seems to deserve, for it contains within a small compass a large amount of statistical and other information, and is, as far as we have been able to test it, accurate and reliable. It is conveniently arranged and well printed.——*Index to the First Volume of the Parish Registers of Gainford, in the County of Durham. Part III. Burials:* 1569–1784. (London: Elliot Stock). The index to the first volume of the Gainford registers is completed with this part. It is a very good example for the custodians of other registers to follow. It is stated to be the intention of the compiler to supplement the index by the publication of complete copies of all the inscriptions in the church and churchyard.——The *Metropolitan* issued, as a supplement to its number of Jan. 3, a very useful sheet Almanac, containing a great deal of information as to the Local Government of the metropolis, including a list of District Surveyors, and the names of Vestry officials. It is likely to be found useful in every builder's office.

Correspondence.

To the Editor of THE BUILDER.

VENTILATORS TO SOIL-PIPES.

SIR,—In reply to the question asked by Mr. Buchan in your issue of December 20, I beg to say that I am responsible for the issue of the circular "showing two valve ventilators with the words above them 'Sugg's new patent continuous up-draught ventilators.—Sugg's and Simmance's patents,'—and underneath the diagrams 'for ventilating soil-pipes, drains, sewers, subterranean passages, &c.'" It seems that for the purpose of making an attack on the inventions of myself and Mr. Simmance, Mr. Buchan has picked out the first words of the paragraph only, and on this text has gone so far as to caution the public, with all the weight of his authority, against the use of these ventilators, without troubling himself to inquire as to the manner in which they are to be used. He hastily jumps to the conclusion, without any warrant or proof whatever, that Mr. Simmance and myself have told the public that our new ventilator could be put on the top of any soil-pipe. We have never done so.

The circular in question does not give any particulars of how the ventilator is to be used for ventilating either soil-pipes, drains, sewers, or subterranean passages. Neither will there be found any diagram relating to the use of our ventilator for any of these purposes, although several engravings are given in an accompanying circular sent with the former, showing how they may be applied for ventilating churches, chapels, and public halls, ships' cabins, trains, and tram-cars.

Obviously, the reason why such directions are not given is shown on the first line of the printed matter on the second page. "The new ventilator is submitted to the consideration of architects." Naturally, every case must be considered according to its requirements.

Mr. Buchan admits that it is possible to use exit valves on soil-pipes under certain circumstances with advantage. Doubtless it is, although neither Mr. Simmance nor myself have ever said even as much as that.

It is true that a gentleman connected with a contemporary called during my absence, and saw a number of ventilators at work at our new building in Regency-street, Westminster.

Amongst them was one fixed on a high 6-in. soil-pipe, amply provided with air-pipes and an abundant fresh air supply, *so that no sewer gas can come into it.* It was working well on a calm day. The six Jennings' patent water-closets connected to it have never shown any liability to unseal under severe trials.

The object which I and Mr. Simmance have always had in view is to ventilate soil-pipes by means of a continuous current of fresh air always moving in the same direction, in a manner to prevent sewer gas from getting into the soil-pipe.

We shall be pleased to lay our ideas before you or any of your readers who may wish to know them, but I do not desire to make use of this letter, already sufficiently long, to obtain a free advertisement in your columns.

As to the question of the patents, if Mr. Buchan

chooses he can purchase the Blue-book of any patent as soon as it is published. The Patent Office provides the greatest facilities for any enquiring mind. He can then study our patents at his ease, and if he finds we claim, in our ignorance, anything he published long ago, we shall be glad to know it.

In conclusion, I think that when Mr. Buchan has leisure to reflect on the whole matter, he must admit that he has not been as just towards us as he should have been, considering the high position he occupies as a shining light in sanitary matters.

At the same time, the outcry that Mr. Buchan has raised, and the warning he has given on the subject of soil-pipe ventilation, although based on an erroneous conception of the views held by Mr. Simmance and myself on that important matter, will be productive of great good if it results in awakening greater attention to those defective sanitary arrangements in dwelling-houses which are unhappily so common. In that case, both myself and Mr. Simmance will be content to have suffered a passing injury which the more widely-authoritative read statements of Mr. Buchan may have done us.

With this I hand you a tracing which is intended to illustrate our ideas of soil-pipe ventilation by means of our ventilator.

WILLIAM SUGG.

ECHO.

SIR,—Of one thing your correspondent [p. 15, *ante*] may rest assured,—that *theoretically* the proportion of his room is almost as bad as it can be. I do not believe that curtains will do much for it, but I do think that it may be greatly amended, if not completely cured, by cutting off the upper angles on two opposite sides of the room (including the coved side) with quasi-rafters, ceiled beneath, carried from the edge of the lantern to the height of 8 ft. from the floor measured upon the wall. The size of the lantern is not given, but I am supposing it to be about 6 ft. wide, thus making the rafter about 9 ft. long. WILLIAM WHITE, F.S.A.

FOLIAGE USED BY THE OLD ARCHITECTS.

SIR,—Can any readers give me instances other than the oak, ivy, thorn, rose, lily, vine, and wheat, of flowers and leaves found in the work of the Mediæval architects? The place where they exist is desired at the same time.

A. E. P. DOWLING.

"INK-PHOTO."

SIR,—While admitting that the "ink-photo" reproduction of your drawing of Canterbury Cathedral, published in the *Builder* of January 3, is not altogether satisfactory, we respectfully beg to assert that the deficiencies are not inherent in the process employed, but are solely due to the unfortunate circumstances (already detailed in your "personal explanation") which necessitated your handing the drawing to us for reproduction on the day now known as "Black Monday," without the alternative of waiting for brighter weather.

We trust you will, in justice to the "ink-photo" process, insert the above explanation in your next issue. SPRAGUE & CO.

OBITUARY.

PROFESSOR JOHN MARSHALL.—Mr. John Marshall, F.R.S., President of the General Medical Council, and Professor of Anatomy to the Royal Academy, died on the 1st inst. at his house in Cheyne-walk, to which he had lately removed from Savile-row. He was born at Ely in 1818.

MR. CHARLES KEENE.—The death took place, on Sunday last, of Mr. Charles S. Keene, whose inimitable sketches initialled "C. K." have appeared for so many years past in *Punch*. He was born at Hornsey in 1823, and on leaving school he (according to the *Times*) entered the office of his father, a solicitor in Furnival's Inn. His artistic tendencies, however, soon caused him to give up his legal employment, and he was apprenticed to Messrs. Whymper, a firm of wood engravers, for whom, among other works, he designed a series of illustrations for an edition of "Robinson Crusoe." When his term of service was concluded he became a contributor to several periodicals,—notably the *Illustrated London News* and *Once a Week*. His connexion with *Punch* began with the acceptance of certain designs for initial letters and tail-pieces; and in the early part of 1850 he became permanently attached to the staff, then under the direction of Douglas Jerrold. It was only, however, after the death of John Leech that he became one of the principal contributors to its pages. The only artistic training Mr. Keene ever received was at the Life School, then situated in Clipstone-street, Fitzroy-square, but which has since removed to Langham Studios. Here he attended weekly meetings of a sketching club, in connexion with which he drew numerous studies in charcoal. His sketches were, as a rule, first drawn with pen and ink, and he very seldom worked in colours.

The Student's Column.

VENTILATION AND WARMING.—II.

NATURAL VENTILATION.

THE methods by which fresh air can be introduced into a building or apartment may be classed under two heads: (1) those systems in which ventilation is effected by natural means; (2) those in which ventilation is effected by artificial means.

The terms Natural Ventilation and Artificial Ventilation will, accordingly, sufficiently and conveniently divide our subject.

By Natural Ventilation we understand that in which kinetic energy concerned in the movement of the air is produced by natural causes, whether apparatus be used to facilitate or direct the movement or not.

Under the head of Artificial Ventilation we include all those systems in which movement of the air is produced by the consumption of mechanical power or artificial energy.

Natural ventilation is, therefore, the category under which all "self-acting" systems of ventilation should be classed, and we shall see as we proceed that the limitations as well as the advantages of natural ventilation apply with equal impartiality to all such systems.

The universal cause producing atmospheric movement in natural ventilation is *difference of air-pressure;* or, expressed in other terms, *variation of the specific gravity of the atmosphere under varying conditions.*

"Difference of air-pressure" results in several ways; from differences of temperature, from differences of barometrical pressure or wind, from differences in degree of purity or moisture.

Difference of temperature is a factor of high importance in the production of motion in air, owing to the operation of the law of expansion to which atmospheric air, in common with all other elastic fluids, conforms.

This law may be thus stated. "With no variation of pressure all elastic fluids expand $\frac{1}{273}$ of their bulk at a temperature of 0 deg. C for each degree of variation of temperature." This expansion is here stated in terms of degrees of the centigrade thermometer, the co-efficient of expansion being thus ·003665 for each degree C., or, if we take our ordinary English thermometer with Fahrenheit scale, our co-efficient becomes ·002039, or $\frac{1}{491}$, for each degree F.

The expansion thus caused by rise of temperature naturally involves the reduction of the specific weight of the air, and hence there will be a difference of air-pressure between the masses of air of different temperature.

Now, the volume of an elastic fluid varies inversely as the pressure upon it, so long as the temperature remains constant, hence the pressure of two masses of air of different temperature varies also inversely as the temperature.

When, therefore, we have two masses of air of different temperature brought into connexion, we find that, as they are in different states of tension, *i.e.*, of different specific weight, and as air is a perfectly elastic fluid, motion results from the expansion of the heavier toward the lighter, that is, from difference of air-pressure.

Wind, which is but another manifestation of the action caused by variation of atmospheric pressure, plays an important part in natural ventilation; indeed, it is almost the sole source of whatever kinetic energy is displayed by "self-acting" ventilators. In this country the wind seldom falls to less than six miles an hour, and averages twelve miles an hour, so that we have here, ready to hand, a motive power of some value.

Difference of air-pressure results also from the varying degree of purity of the atmosphere; thus, the specific gravity of carbonic acid is 1·529, and of sulphuretted hydrogen 1·177 in terms of the unity of air. An addition of carbonic acid, or of other gaseous impurity, and *a fortiori* of water, vapour, or organic matter, alters the specific gravity of the atmosphere, that is, causes a difference of air-pressure.

From this cause, the weight of exhaled air from the lungs, owing to its greater specific gravity by reason of its impurity, is at a temperature of 90 degs. F., balanced in weight by normally fresh air at a temperature of 85 degs.

In this connexion, however, we have to consider another natural law of considerable import. In common with other gases, atmospheric air is subject to the law of "diffusion of gases."

This law may be thus stated; gases diffuse into each other in all directions, inversely as the square root of their densities.

From the operation of this law, it results that carbonic acid and other gaseous impurities are rapidly diffused amongst the particles of fresh air, hence the difference of specific gravity from this cause is rapidly becoming diminished, and, therefore, in practical work we need hardly take this factor into account.

But this law does not hold good of the organic impurities which are passed into the atmosphere, hence results the difficulty of getting rid of this source of vitiation. Thus, if in an apartment containing vitiated air, the windows are thrown open, the gaseous impurities are speedily diffused into the external atmosphere, even if there be no difference of temperature or of air-pressure, but the organic impurities are not so diffused, and the sense of smell may detect their presence long after the gaseous impurities are diluted beyond recognition.

Hence we have already a reason for the careful observance of a principle which we shall, hereafter, find to be of importance on other grounds; that, in any well-arranged scheme of ventilation, pains must be taken to direct the stream of fresh air equably and thoroughly through the whole of the apartment; for, if this is not done, much of the impurity may be left comparatively untouched by the current of moving air.

Natural ventilation, through difference of air-pressure, operates by several channels; not only by means of flues or open windows, and doors, which we may term direct communication, but also through the permeability of walls, ceilings, and floors, and through the imperfect fitting of closed doors and windows.

As an example, for instance, of the permeability of ceilings, we may mention the appearance so often to be noted on time-blackened plaster. We frequently see, in such cases, the lines of the ceiling joists or rafters distinctly marked in light colour against the murky general surface. This is simply the result of the filtration of the dirt-laden atmosphere through the permeable plaster as the air passes through, while the greater density of the timbering prevents the action being universal over the whole area.

We have yet one more source of motion in air from natural causes to consider. In common with other fluids a current of air passing through or in contiguity to a mass of quiescent fluid, causes a movement of the latter. It is thus that we find eddies occasioned in a body of water through which a strong stream is rushing, it is thus that an upward current is produced in an open pipe, across the mouth of which a wind is blowing. To utilise this property, many forms of "self-acting" ventilators have been designed and patented, so as to cause the atmospheric current of the wind to take a favourable direction.

We are now in a position to understand wherein consist the advantages and disadvantages of natural ventilation. Inasmuch as kinetic energy has not to be produced by mechanical means, the cost is avoided of developing power, whether by the expenditure of manual force or by the consumption of fuel, either in the production of heated and rarified air or in the formation of steam. We have but to utilise the kinetic energy which Nature provides, and hence cheapness is the great advantage of natural ventilation.

On the other hand, the extent of kinetic energy which we thus obtain is, in ordinary cases, small compared to the amount of work which has to be done in any large scheme of ventilation.

Again, as we have no means of regulating to any appreciable extent either the external temperature or the force of the wind, we find it difficult to avoid incessant fluctuation in the efficiency of the motive power at our disposal. A slight rise or fall of the external temperature or of the barometrical pressure, or a slight variation in the force of the wind, may have a considerable effect upon the difference of pressure of the external and internal atmosphere. Hence we see that natural ventilation has these disadvantages: feebleness of action and irregularity of efficiency.

Of these disadvantages, the irregularity of efficiency is the most serious, for it results therefrom that *no "self-acting" ventilator can be relied upon for constant efficiency of action.*

More than this, since in any scheme of ventilation both inlets for the fresh air and outlets

for the foul air must be provided, there is in every application of natural ventilation a constant danger that, by the fluctuations of the difference of air-pressure, the intended course of the current may be reversed and the outlets become inlets and *vice-versâ*. So that if we use natural ventilation, this is a point that must always be borne in mind and provided against.

The serious character of the irregularity of efficiency in natural ventilation is particularly felt where artificial warming is necessary, for it is at once evident that if the rate of extraction of the warm air and of admission of cold air is fluctuating, very considerable difficulty will be experienced in adjusting the warming power to meet the fluctuation.

SURVEYORSHIPS.

DIOCESAN SURVEYORSHIP, PRETORIA. — Mr. George Arthur Hamliton Dickson, A.R.I.B.A., of the firm of Messrs. Campbell & Dickson, architects and civil engineers, Pretoria and Johannesburg, has been appointed Diocesan Surveyor by the Right Rev. the Bishop of Pretoria, South Africa.

NEW MALDEN.—At the meeting of the New Malden Local Board, on Tuesday evening, Mr. T. V. H. Davidson, Assistant Borough Surveyor of Windsor, was appointed to the joint offices of Surveyor, Engineer, and Inspector of Nuisances to the New Malden Local Board at an inclusive salary of £100 per annum.

GENERAL BUILDING NEWS.

NEW CHURCH HALL AT PECKHAM.—The new Church Hall of St. Mary Magdalene, St. Mary's-road, Peckham, S.E., was formally opened by the Lord Mayor on the 3rd inst. The building, which seats about 400 persons, consists of a hall 51 ft. 6 in. by 31 ft. 6 in., and three adjoining class-rooms, averaging 17 ft. by 14 ft., and is so arranged that by opening revolving shutters every part is in full view of the platform. A soup-kitchen and ample lavatory accommodation are also provided. The interior and external walls of the hall, &c., are faced with best stocks, with red-brick dressings. The whole of the roof is open, and formed with queen-post trusses, which are stained and varnished, as is the whole of the interior joinery. The roofs are boarded with pitch-pine, in narrow widths, and left clean. Each class-room has a fireplace, and the hall is heated by means of two large combination, smoke-consuming and controlled combustion, heating, radiating, and ventilating stoves, supplied by the Carron Company. Mr. W. M. Dabbs, of Portland-avenue, Stamford-hill, was the builder, and the architect is Mr. J. C. Perkin, of New Broad-street, whose design for the building was selected in public competition in April last.

ST. JAMES'S MISSION-ROOM, MOSS SIDE, MANCHESTER.—This building was opened for service on the 6th inst. It is somewhat in the form of a church, and comprises a mission-room, 40 ft. by 31 ft. 6 in., affording accommodation for 250 persons. At the east end is a small chancel, 18 ft. by 9 ft. 6 in., with a vestry on one side and a store-room on the other. The mission-room has an open-framed roof, and is partly lighted by a low clearstory. The front of the building is faced with white bricks, relieved with red bands, and timber-work in the gable, with belfry. The work has been executed by Mr. G. Macfarlane, of Manchester, under the superintendence of the architect, Mr. John Lowe, of Manchester, at a cost, including fittings, of 600*l*.

PUBLIC ROOMS, NEWTOWN, MONTGOMERYSHIRE.—These rooms, after having undergone considerable alterations, extensions, and improvements, have been re-opened. The large concert-room measures 79 ft. by 39 ft., and is 28 ft. high. There are four retiring-rooms or dressing-rooms, a lecture-room on the ground floor, and a large dining-room 49 ft. by 27 ft. above. The New Post-office will not be ready for occupation for a few weeks. A caretaker's house for the public portion of the building is provided, and also one for the Post-office department. The concert-hall has three of Sugg's sun-burners, with powerful extract ventilators attached, and there are numerous Tobin inlets provided. The heating throughout is by hot water, and has been done by King, of Liverpool. The architect for the alterations is Colonel David Walker, of Liverpool. The contractors were Messrs. Davies & Son, Newtown.

NEW PUBLIC HALL, DUNDEE.—On the 29th ult. the Rosebank Public Hall, Dundee, was opened. The building was originally an old factory. The old joists which crossed the roof have been removed, as well as several of the iron columns supporting the roof. The ceiling, which is divided into two sections, and is supported in the centre by a series of columns, takes the shape of a half barrel, and is panelled in wood. Ante-rooms have been provided on either side of the platform, which is situated at the north end of the hall. Retiring-rooms have also been fitted up at the south end, along with lavatories, refreshment-buffet, &c. Over the retiring-rooms at the south end of the hall is a balcony. The hall is capable of seating 1,500 people. The work has been carried out under the supervision of the architect, Mr. Richard J. Murray, Dundee.

BUSINESS PREMISES, BELFAST.—We learn from the *Belfast Newsletter* that a new warehouse for Messrs. Swanston & Bones has been erected on a portion of the large plot of ground in Queen-street, between Messrs. J. & R. Young's premises and College-street. The remainder of the site is taken up by four spacious warehouses, built to the order of Mr. William Swanston, some of which are already let. Messrs. Swanston & Bones' main entrance is placed on the angle formed by the two streets, and has niche shafts of polished Peterhead granite, supporting a boldly-moulded arch. At each side of this are placed carved shields, charged with the arms of the city of Belfast and the province of Ulster respectively. A circular turret starts over the doorway, and is continued up above the main cornice, terminating at a height of 75 ft. in a steeply-pitched conical roof, covered with green slates. The entire frontage is four stories in height, with a massive cornice and parapet above. All the ground floor walling, to a height of 15 ft., is faced with random ashlar of Scrabo sandstone from the Glebe quarry. The dressings of the windows are of rubbed sandstone. A large gateway, with elliptical arch placed in College-street, affords access to the yard of Messrs. Swanston & Bones' premises, which contains engine and boiler house, with a large chimney 90 ft. high. The façades in both streets are broken up by a series of pilasters, which divide them into numerous bays. Mr. Swanston's buildings are designed with a common yard covered with a glass roof in two spans, and so arranged that carts can be loaded in each warehouse. A spacious gateway opening into Queen-street forms the central feature. The windows and other architectural features of this block are similar to the first-described premises. Each warehouse is four stories in height, with ample light at front and rear, all being fitted with hoists and having sanitary improvements of the latest kind. Both of the contracts have been carried out by Messrs. Fitzpatrick, builders, Great Victoria-street, from the plans and under the superintendence of Messrs. Young & Mackenzie, architects, Belfast.

THE PROPOSED NEW CENTRAL CRIMINAL COURTS FOR LONDON.—Writing with regard to some improvements at the Old Bailey, the *City Press* is gratified to learn that something has at last been done to improve the present disgraceful condition of the accommodation provided for prisoners awaiting trial at the Old Bailey sessions. Vast improvements have been nearly completed which will enable untried prisoners to be in something approaching comfort and decency. Even as it is there is much left to be desired, but the present arrangement will serve until the new Central Criminal Courts, so long designed, are built. The City is prepared to take these in hand immediately a settlement is come to with the Home Office. This matter has been awaiting the convenience of the Secretary of State for nearly a year past, and it is quite time that it was taken in hand seriously.

CHRIST CHURCH, GLODWICK.—The chancel of Glodwick Church, Lancashire, has just been re-opened, having been closed for nearly two months, during which time very material alterations have been made. This portion of the church was built some twenty-five years ago by the late Mrs. Clegg, of Broomhurst, Werneth, in memory of her husband, and now, as a fitting memorial to her, the cost of the present alterations has been defrayed by her family. The wooden steps and flooring have been replaced by marble steps and mosaic pavement, and the choir stalls now stand on a pavement of wooden blocks. The two steps at the entrance to the chancel are dark green marble, the sanctuary step of dark red, and that on which the altar stands is white. A dado to the height of about 6 ft. has been placed on the north and south walls of the sanctuary; the plinth red, the same colour as the step, the dado itself being of alabaster marble, with a dark green cornice. A credence table of Caen stone, in character with the reredos, has been let into the south wall, and the reredos thoroughly cleaned. This work has been executed by Messrs Patterson, Manchester. The four panels of the reredos are shortly to be filled with figures in mosaic work, representing the Evangelists.

MAIDEN BRADLEY CHURCH, NEAR FROME.—The floor of the chancel of this church has lately been taken out and a new concrete foundation put in, the floor being laid with encaustic tiles. New sanded Keinton stone steps have been placed under the chancel arch. The cost of this part of the work has been defrayed by Christ Church College, Oxford (the patrons of the living), and voluntary contributions. As a memorial to her sister, Miss Elizabeth Beatrice Coles, of Hove, Brighton, Mrs. Hanson, wife of the Rev. E. K. Hanson, the vicar, has placed new sanctuary and altar steps of polished Keinton stone, had the floor of the sanctuary relaid with encaustic tiles, and given new altar-rails, the standards of which have been manufactured by Messrs. J. W. Singer & Sons, Frome. The tiles were supplied by Messrs. Webb & Co., of Worcester. The whole of the work has been carried out by Mr. John Vallis, Frome. The architect concerned was Mr. F. W. Hunt, of London. Mrs. Hanson has painted an altar-piece. In the north panel is a figure of St. Cecilia, in the south panel a figure of St. Elizabeth of Hungary, and in the centre panel St. George, St. Hugh of Lincoln (prior of Witham Friary), St. Agnes, and St. Mary Magdalene.

NEW BOARD SCHOOLS, READING.—New schools have just been erected by the Reading School Board on land between the Hatherley-road and Blenheim-gardens-road. The new buildings will provide accommodation for 1,166 children, and in addition a centre is provided for teaching cookery. The style of architecture adopted is a free treatment of "Queen Anne." The walls are of red brick, and all the mouldings and ornaments are cut out of the same material, and the roofs are tiled. The ground floor is occupied by girls, and the upper story by boys. In the centre of the plan is a corridor, 56 ft. long and 16 ft. wide, around which the several class-rooms are arranged, each with a separate door into the corridor. The floors of the upper corridor and upper clothes-room are of fireproof construction on Homan & Rogers' patent principle, and the staircases are of Wilkinson's patent stone. The infants' department forms a separate detached block of one story in height, and consists of a schoolroom divided into two by patent swivel partitions, two senior class-rooms, and a babies' class-room. Each division of the school-room and each class-room has separate access to an entrance corridor. A clothes-room has been provided. There is a lavatory adjoining the clothes-room, and teachers'-rooms are provided on an upper floor. The cookery centre is a detached building. The surface of the ground-floor throughout is covered with concrete and Portland cement, and all the rooms and corridors on the lower story have floors of patent pitch-pine blocks, keyed with steel discs, and laid in herring-bone pattern in a composition of asphalte. Similar flooring is also laid to the upper corridor upon the fire-proof construction. The corridors and clothes-rooms are heated by hot-water pipes and coils, and the rooms by Shorland's patent "Manchester" ventilating-grates. There are also vertical tubes provided for the admission of cold air, and upcast foul-air flues are constructed side by side with the smoke flues for carrying off vitiated air. The schools have been erected from the designs of Mr. S. S. Stallwood, of Reading, and the works have been carried out, under the direction of the architect, by Messrs. Winter & Fitt, builders, of Reading.

RENOVATION OF ST. BEDE'S CHURCH, LIVERPOOL.—This church, situated in Hartington-road, has just been re-opened, after having undergone various alterations. In consequence of dry rot, all the old floors and the wet soil beneath them have been entirely removed, and the whole area covered with concrete and wood-block floors. A new inner roof of pitchpine has been erected at a distance of 14 ft. lower than the original roof. A new heating apparatus has been inserted by Messrs. Newton, Chambers, & Co., and the vestry and church-room warmed by hot-water pipes. A new system of lighting has also been introduced by Messrs. Sugg. The church has been decorated throughout by Messrs. A. L. Moore & Co., of London. The general contractor has been Mr. Thomas Haigh, of Liverpool, and the whole of the work has been carried out under the supervision of Messrs. Habershon & Fawckner, architects, London. The cost of the various works has been about 1,800*l*.

NEW R.C. CHAPEL AND SCHOOLS, DUNDEE.—On the 25th ult., the new Roman Catholic schools and chapel erected at Lilybank, Dundee, were opened by the Rev. Bishop Smith. The building, which has been erected from plans prepared by Messrs. Pugin & Pugin, London, stands at the angle formed by the junction of Lilybank-road with Robertson-street. The schools are in the Gothic style of architecture. Internally the structure is divided into two stories. The lower portion is reached by a short flight of stairs, and is divided by glass partitions so as to provide three rooms. The chapel is on the upper story.

RESTORATION OF PRESTWOLD CHURCH. — The ancient little church at Prestwold, Leicester, has recently undergone restoration. Latterly the church had become dilapidated, and Sir Arthur Blomfield, A.R.A., was consulted as to the best means of effecting an improvement. Acting upon his advice, it was decided to remove the old Italian nave, to replace it with a nave of the Gothic style of architecture, and to entirely re-model the internal arrangements. The work was entrusted to Mr. John Thompson, of Peterborough. Externally the church has undergone considerable alteration, a new high-pitch roof taking the place of the flat roof on the old building. The roof is covered with Broseley tiles. Internally the gallery has disappeared, and the arch between the tower and nave has been opened out again and restored to its original proportions. The roof is of oak with tracery principals, and at the north-east end of the nave an organ chamber has been added. The nave is lighted by three Gothic windows on the north side and four on the south. The windows throughout are glazed with cathedral tinted glass. The floor in the aisle is composed of red tiles, and in the seats of wood blocks. The whole of the internal fittings are of oak. The octagonal pulpit is also of oak. At the east end the three-light window with Gothic tracery has been filled in with stained glass by Messrs. Powell & Son, of London. The church is heated by hot-air apparatus. The whole cost of the restoration has been borne by Mr. Hussey Packe.

OPENING OF A BOARD SCHOOL AT YORK.—On the 1st inst., the first Board School for York was formally opened. Externally the buildings are built of red brick, with pressed brick dressings and arches, and green slated roofs. The style is based on that of the Netherlands in the seventeenth and eighteenth centuries. The buildings are arranged in two blocks. The boys' and girls' schools are on the north side of the site, and fronting on to Shipton-street, with the caretaker's cottage at the north-west corner, and the infants' school at the south-west side. The boys' and girls' schools are for 460 children, and are arranged with central hall corridors, with the school and class-rooms, &c., opening into them. The halls are each 50 ft. by 14 ft. The school rooms are on the south side, and there are five class-rooms on the north side. There are also separate coat and cloak-rooms. The infants' school will accommodate 200 children, and consists of entrance corridor, with a cloakroom adjoining, schoolroom, class-room, and other rooms. The buildings are warmed on the warm-air system; in addition to which fire-places are provided in the school and class-rooms and a system of hot-water circulation in the corridors and cloak-rooms. The work has mostly been executed by local contractors as follows:—Messrs. Wilson & Sons, general contractors and joiners; Messrs. J. & T. Biscomb, masons and bricklayers' work; Messrs. Rawling & Sons, plasterers' work; Mr. Hardgrave, slating; Mr. T. G. Hodgson, plumbing; Mr. J. Thomas, painting. The architects were Messrs. Demaine & Brierley, of York. The cost of the undertaking is about 6,500*l.*

SANITARY AND ENGINEERING NEWS.

THE ASSOCIATION OF PUBLIC SANITARY INSPECTORS OF GREAT BRITAIN.—At the usual monthly meeting of this Association, held on Saturday last, at Carpenter's Hall, an address on "London Sanitation and Sanitary Inspectors," was given by Captain W. H. James, R.E., who was until lately the Chairman of the Sanitary Committee of the London County Council. A report is in type, but is unavoidably held over until next week.

WATERWORKS FOR PRETORIA, SOUTH AFRICA.—Messrs. Campbell & Dickson, A.R.I.B.A., are the resident engineers of the Pretoria waterworks, now in course of construction, Mr. E. Pritchard, of London and Birmingham, being the Consulting Engineer in England.

THE SANITARY INSTITUTE'S EXAMINATION FOR SANITARY INSPECTORS.—At an Examination for Inspectors of Nuisances, held at Leeds on December 19 and 20, thirty Candidates presented themselves. Questions were set to be answered in writing on the 19th, and the Candidates were examined *viva voce* on the 20th. The following seventeen Candidates were certified to be competent, as regards their sanitary knowledge, to discharge the duties of Inspector of Nuisances:—T. Brindle, Chorley; J. Brown, Whitby; W. H. Crane, Hull; W. H. Harrison, Rotherham; W. A. Mason, Shildon; W. Matthews, Kedleston, Derby; G. Milne, Sanitary Inspector, Ballater, N.B.; T. S. Prescott, Gorton; J. T. Proffitt, Bolton; W. B. Shaw, Wellingborough; R. Skinner, Leeds; J. W. Smith, Carlisle; J. Spencer, Keighley; T. J. Trowsdale, Stockton-on-Tees; T. W. Waddington, Padiham; S. Webster, Liverpool; and T. Windle, Burnley.

THE "AMINES" PROCESS OF SEWAGE PURIFICATION.—Mr. E. B. Ellice-Clark, M.Inst.C.E., requests us to announce that he has resigned his seat at the Board of the Amines Syndicate (Ltd.), and that he has no further connexion with the company.

SCARCITY OF WATER IN LIVERPOOL.—At the monthly meeting of the Liverpool Town Council on Wednesday Mr. Bowring called attention to the present unsatisfactory state of the water supply to the city. He asked the cost of the straining tower at Vyrnwy Works, and what progress had been made with the cutting under the Mersey, and urged that temporary pipes should be laid on the bed of the Mersey, in order that people who were paying 85,000*l.* a year for the water should obtain some of it.—Sir W. B. Forwood also urged the necessity of energetic steps being taken, not only to get water from Vyrnwy, but for the relaying of pipes from Rivington, which were now so corroded that, instead of getting 16,000,000 gallons a day, they could only get 12,500,000 gallons.—Alderman John Hughes, Deputy Chairman of the Water Committee, said that a special meeting of the Committee had been called to consider the matter, and he believed they would not permit any delay whatever. The straining tower and plant had cost 34,000*l.*, as he had been informed.

STAINED GLASS AND DECORATION.

DODDINGTON CHURCH, CAMBS.—Stained glass has been inserted into the east window of the old church of Doddington, Cambs. The work, which has been executed in the style of the fifteenth century, illustrates the principal events in the life of the Saviour. It is from the studio of Messrs. Powell Brothers, of Park-square, Leeds.

WETHERBY CHURCH.—In memory of the late Miss Sanderson, the western tower window has just been filled with richly-coloured stained glass, illustrating the subject, "Christ blessing little children." The work has been designed and executed by Messrs. Powell Brothers, of Park-square, Leeds.

MEMORIAL WINDOWS, WARFIELD.—Three new memorial windows, the gift of Mrs. Cazenove and her family, were unveiled in the parish church of St. Michael and All Angels, Warfield, Berks, on Christmas Day. The designs have been executed by Messrs. Powell & Sons, of London. The subjects are "Christ blessing little children," and "Christ approaching the storm-tossed ship, and saying, 'It is I, be not afraid.'" A small lancet window contains the simple figure of the "Good Shepherd."

MEMORIAL WINDOW, ST. MARK'S CHURCH, BROOMHILL.—A new memorial window has just been erected in St. Mark's Church, Broomhill, near Sheffield, in memory of Alderman Brooksbank J.P., of Southbourne. The window has been executed by Messrs. Clayton & Bell, of London. It is a three-light window, situated at the east of the south aisle, and the subjects selected for representation are the parables of the ten talents and of the Good Samaritan—three scenes from each.

WORDSLEY.—A stained-glass window has just been placed in a side window of the chancel of Wordsley Church, by Messrs. G. & E. Webb, of Wordsley, Stourbridge. It consists of two lights, divided by a transom and tracery; the subjects illustrated are:—"The Three Marys going to the Tomb to Anoint the Body of Our Saviour," "The Resurrection," "Our Saviour and Mary Magdalene in the Garden," and "The Unbelief of St. Thomas," with angels in the tracery bearing text, and the whole having a structural canopy and base. The window has been designed and carried out by Messrs. Winfields (Limited), of Birmingham.

FOREIGN AND COLONIAL.

FRANCE.—At the Champ de Mars offices last week M. Alphand was presented with his bust in marble by the general staff of the Direction of the great Exhibition. Among those present were MM. Charles Garnier, Contamin, Dutert, Formigé, and Bouvard. M. Alphand has since left for Pau in company with M. Laforcade to direct the works of embellishment there.——M. Dézermaux, architect for the buildings for Class 63 at the great Exhibition, has been appointed architect for the French Exhibition to be opened this year at Moscow. The engineer in chief for the same Exhibition is M. Berthot, who was engineer for Classes 50, 51, and 56 in the 1889 Exhibition.——The Municipal Council of Paris have now let the Palais des Beaux Arts to the Musée des Arts Decoratifs, at an annual rental of 30,000 francs, and on the condition that the galleries necessary for the Meissonier Salon should be let to that body at a rent of not more than 15,000 francs yearly.——A committee has been formed, under the presidency of the Minister of Public Instruction, for erecting a statue to the poet Moreau.——The town of Epernay has opened a literary and artistic competition in honour of Joan of Arc; the artistic portion will include pictures, enamels, faïence, etchings, statues, bas-reliefs, medallions, &c. The sole condition is the personification, in whatever manner, of the pet heroine of France.——The President of the Republic has presented to the "Cercle National des Armées de Terre et de Mer" a splendid centrepiece in Sèvres porcelain, representing the "Triumph of Bacchus."——It is stated that M. Falguière, the eminent sculptor, has given in his adherence to the Salon Meissonier, and will send his works there this year.——The Académie des Beaux Arts has elected M. Meissonier as its president for 1891, and M. Bailly, the architect, as vice-president.——The death is announced of the painter, Julien Perret, at Saint-Chéron, in his thirtieth year.——The death is also announced of the architect G. Giucestre. He was born in 1857, entered the École des Beaux Arts in 1877, and on leaving the schools founded a preparatory academy of architecture which he directed with great success.——A competition was recently opened for a new Chamber of Deputies and Senate House at Bucharest. The French architects, MM. Vallot and F. Jolly, who were appointed judges of the competition, have awarded the first premium for the Chamber of Deputies to M. Maernarolu, a Roumanian architect, and that for the Senate House to M. Alexandre Marcel. The second premium for the Senate House has also gone to a Frenchman, M. Albert Ballu, and the third to a Roumanian, M. Socolesco.——The Righi railway is about to have its counterpart in France in that which will take tourists from La Mare to the summit of Mount Beaumont, in the Hautes Alpes, a height of about 1,900 mètres. A large hotel will be built on the summit, from which there will be a splendid view over the surrounding country. The works will be commenced in the coming spring.——The ancient college of Bar-le-Duc, founded in 1563 by Gilles de Trêves, is about to be restored for use as a girls' school. It is one of the rare examples of the architecture of the sixteenth century, and M. Demoget, the architect commissioned to carry out the necessary work, will scrupulously respect, we are told, all existing details.——M. X. Marnier, of the Academie Française, has promised to leave his valuable collection of engravings and rare books to the town of Pontarlier (Jura).

THE GREAT STEEL BRIDGE ACROSS THE COLUMBIA RIVER AT VANCOUVER.—An American paper says that, according to published accounts of the great steel bridge across the Columbia River at Vancouver, its length will be 6,000 ft. from the Washington to the Oregon shore. It will be double-tracked, with a roadway on top for teams. The opening available on each side of the draw-pier, for vessels to pass, will be 200 ft. The whole structure is to be of steel, built 10 ft. above the high water of 1876, and 40 ft. above low water. It will probably not be completed before January, 1892.

TESTS OF MATERIALS OF ARCHES IN AUSTRIA.—Tests of the resisting-powers of arches of different materials are about to be carried out on a large scale by the Society of Engineers and Architects of Austria. The tests will be divided into three groups. Group I. will comprise tests of strength and elasticity of the materials used in arch work; Group II., resistance tests of small span arches; and Group III., resistance tests of bridge arches of spans of 23 mètres (about 75 ft.). Special interest, it is thought, will be attached to the tests comprised by this last group. Different kinds of masonry and *béton* arches will be tried and compared with an iron arch of the same dimensions. The arches are to be tested with special reference to their use as railroad bridges. The loads are to be gradually increased until the arches give way. Careful observations are to be made of the behaviour of the latter during the different load applications; measurements of their distortion are to be carried out, &c. The trials will be conducted in one of the quarries near Vienna. It is understood that the cost of the trials will be covered by subscriptions by various railroad companies and others, and that ample funds will be available for a thorough investigation.—*Engineering Record, N.Y.*

MISCELLANEOUS.

THE INSTITUTION OF CIVIL ENGINEERS was founded on January 2, 1818, so that it has reached its seventy-third anniversary. Its Presidents have been, successively, *Thomas Telford, James Walker, Sir John Rennie, Joshua Field, Sir William Cubitt, James Meadows Rendel, James Simpson, Robert Stephenson, Joseph Locke, George Parker Bidder,* Sir John Hawkshaw, *John Robinson McClean,* Sir John Fowler, Bart., K.C.M.G., Sir Charles Hutton Gregory, K.C.M.G., *Charles Blacker Vignoles,* Thomas Hawksley, *Thomas Elliot Harrison,* George Robert Stephenson, *John Frederic La Trobe Bateman,* William Henry Barlow, James Abernethy, Lord Armstrong, C.B., Sir James Brunlees, Sir Joseph William Bazalgette, C.B., Sir Frederick Joseph Bramwell, Bart., Edward Woods, and Sir George Barclay Bruce. The names in *italics* indicate those who are no longer living. The present President is Sir John Coode, K.C.M.G. The numbers of the various classes now on the books comprise 1,700 Members, 2,880 Associate Members, 427 Associates, 19 Honorary Members, and 927 Students—together, 5,953.

SELBY ABBEY.—The *Leeds Mercury* gives the following extract from a report of the Vicar of Selby in regard to the progress of the work of repair at Selby Abbey:—"In a little over twelve months the large sum of nearly 7,000*l.* has been raised, a considerable portion of which has come from the people of Selby themselves. I think we may accept this as one proof, at least, that there exists in the town deep affection for our beautiful old church. I am frequently asked, 'When will the work at the church be finished?' It is a question difficult to answer, for several reasons. In the first place, the progress must necessarily be slow, for we are building what we hope will last—not for years, but for generations. Again, much depends upon the extent of the work. Our present funds are sufficient for the interior work, but there remains the work in connexion with the tower and south transept, which we shall undertake if additional funds come in."

THE HARROW AND STANMORE RAILWAY.—This new branch line to Stanmore from the London and North-Western main line at Harrow was formally opened to the public on the 18th ult., by Mr. Findlay, of the London and North-Western Railway Company. The new railway will open up some of the most beautiful and picturesque country within easy distance of London, and now, with increased railway accommodation, Stanmore will doubtless become a favourite residential district of the highest class. Mr. R. T. Wreathall, F.S.I., of London and Harrow, the surveyor to the Company, bought the land for the line, which is being worked by the London and North-Western Railway Company.

THE INSTITUTION OF ELECTRICAL ENGINEERS.—The opening meeting of this Institution for the current session will take place on Thursday, the 15th inst., when the President, Mr. W. Crookes, F.R.S., will deliver his inaugural address.

THE ST. PAUL'S ECCLESIOLOGICAL SOCIETY.—At the next meeting of this Society, to be held at the Chapter House, St. Paul's, on Wednesday next, a paper will be read by Mr. Edward J. Tarver, F.S.A. on "Screens."

COMPETITIONS, CONTRACTS, AND PUBLIC APPOINTMENTS.

COMPETITIONS.

Nature of Work.	By whom Advertised	Premium.	Designs to be delivered.
*New Markets and Abattoirs	Bury Corporation	75*l.* 50*l.* and 25*l.* ..	Mar. 31
*New Municipal Buildings, Police Court, &c	do.	150*l.* 100*l.* and 50*l.*	do.

CONTRACTS.

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Water Tanks for Stations, Tyres, and Galvanised Roofing	India Office	*Official*	Jan. 13
*Sewerage Works	Tottenham Local Bd.	J. E. Worth	do.
*Works and Materials	Wandsworth Bd. of Wks	*Official*	do.
*Main Drainage Extension	West Ham Council	Lewis Angell	do.
Paving Setts, &c.	Sowerby Local Board	Eli Hartley	do.
Tool Works Chimney, Offices, &c. Water-lane, Halifax	.....	Jas. Farrar	do.
Providing and Laying Pipe Drain	Billericay U.R.S.A.	*Official*	do.
Steel Rails, Steel Sleepers, and Fishplates	Bombay, Baroda, and Cent. India Ry. Co.	do.	do.
New Offices, Warehouse, and Factory Buildings	M'Caw, Stevenson, & Orr, Lim.	W. H. Stephens	do.
Additions and Alterations to Hotel, Porthcawl	Porthcawl Hotel Co. Lim.	G. J. Brind	Jan. 14
Iron, Smithwork, &c.	Belfast Police Com.	*Official*	do
*Execution of Works for Three Years	Hackney Bd. of Works	J. Lovegrove	do.
*Removal of Dirt, Dust, Ashes, &c.	Crown Estates Paving Commrs.	*Official*	do.
*Roadmaking and Paving Works	Hammersmith Vestry	H. Mair, C.E.	do.
*Works at Burton-on-Trent and Leeds	M. R. Co.	*Official*	Jan. 15
Police Station, Low Moor, near Bradford, Yorks	Standing Joint Com. of West Riding	J. V. Edwards	do.
Thirty-four Cottages, New Tredegar	New Tredegar Building Co. Lim.	.....	do.
Taking-down and Re-building the "Three Compasses Inn," Charminster, near Dorchester	.....	Crickmay & Sons	do.
*Iron Gates and Gate Posts	Central Markets Com.	*Official*	Jan. 16
New Post-office, Stratford-on-Avon	Com. of H.M. Wks, &c.	do.	do.
Repairing Roads and Bridges at St. Andrews and Speymouth	Elgin County Council	H. J. Mackenzie	do.
*Erecting and Completing Boundary Wall, Railing, and Entrances to Churchyard	Commrs. of Sewers	*Official*	do.
Road Metal, &c. Elgin, N.B.	.....	H. J. Mackenzie	do.
Chimney Stack and Porch at Workhouse	Cardiff Union	Seward & Thomas	do.

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.
Thirty Dwelling-houses, Halifax	.....	Horsfall & Williams	Jan. 17
*Making 900 yards of Roadway, Sawbridgeworth	.....	A. U. Higgins	do.
*Repair and Maintenance of Water Carts and Vans	St. Pancras Vestry	W. B. Scott	Jan. 19
Hotel, Tonypandy, Rhondda Valley	Tonypandy Brewery	.....	Jan. 20
Thirty Cottages, Kinsley Common, near Wakefield	New Hemsworth Colliery Co. Lim.	.....	do.
*New Police Station, &c. at Leek	Staffs. County Council	W. Sugden & Son	Jan. 22
Banking Premises, Leeds	York City and County Banking Co.	Smith & Tweedale	do.
Two Shops and Offices, Southgate-street, Halifax	.....	Jas. Farrar	do.
*Erection of Houses, &c. Lydd, near Kent	Admiralty	*Official*	Jan. 23
*Improvement of River Lea	Birmingham Public Works Com.	W. S. Till	Jan. 24
New "Boar's Head Inn," Southgate, Halifax	.....	Jos. F. Walsh	do.
*Weights and Measures Office, Newington	London County Council	*Official*	Jan. 27
Additions to New Town Schools	Wednesbury Sch. Bd.	E. Pincher	Feb. 1
Four Small Villas, Ryeland Estate, Hereford	.....	W. W. Robinson	No date
Cliff Railway or Lift at Clifton, Bristol	Geo. Newnes, M.P.	Marks & Munro	do.
Alterations to "Speed the Plough Inn," Felling	Mr. J. White	B. F. Simpson	do.
Restoring and Enlarging Church at Wallsend	.....	Hicks & Charlewood	do.
Felling and Cutting Timber, W. Hartford	Mr. J. Foggo	.....	do.
Free Library and Technical School, Ashton-under-Lyne	.....	J. Eaton & Sons	do.
*New Medical Schools, Owens College, Manchester	.....	A. Waterhouse	do.

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary	Applications to be in
*Surveyor's Assistant	Burton-on-Trent Coun.	150*l.*	Jan. 14
*Accountant Clerk	Civil Service Com.	Not stated	do.
*Temporary Civil Engineering Assistant	Hull Corporation	200*l.*	Jan. 19
*Engineer Students and Students in Naval Construction	Civil Service Com.	Not stated	Mar. 16
Surveyor, &c.	Ware R.S.A.	120*l.*	No date

Those marked with an Asterisk (*) are advertised in this Number. *Competitions, p.* iv. *Contracts, pp.* iv, *and* vi. *Public Appointments, p.* xxi.

MESSRS. BOLLING & LOWE'S STEEL AND IRON REPORT.—Messrs. Bolling & Lowe, in their annual report on the iron and steel trade, thus refer to the possible effects of the spread of Protectionist ideas abroad upon our iron and steel trade:—"The United States, under influence of the Republican party, now in power, have lately fixed a new and higher tariff in order to encourage home industry, which will do its utmost to prevent imports of manufactured articles from Europe. Such an extreme Protectionist tariff would, under ordinary circumstances, have encouraged American manufacturers immediately to launch out in extension of works, and to lay down new plant for the production of articles so heavily taxed, but as yet they hesitate. This hesitation may be founded on the fact that the recent elections in the United States have gone in favour of the Democratic party, which objects to heavy taxation of ordinary necessaries of life and comfort. Therefore, in the near future, there looms a possibility of this crushing tariff being cut down to a moderate scale. The imports into the United States of iron and steel and other articles might consequently not diminish materially for some time, as soon as the enormous stocks, hurried in before the tariff came into force, are lessened. Tinplates (our most valuable metal export to the United States, 4,386,133*l.* for eleven months) will have the benefit where they have come from this country, and can be proved to have been worked up into goods for export, that the duty will be refunded by their Government to the exporter, less a deduction of one per cent. There is a continued tendency in nearly all countries to increase their protective duties. We have seen what has taken place in the United States; France is on the point of rearranging all her tariff in this spirit, and Russia is on the same path. It has now become a very important question for manufacturers and traders in Great Britain to consider whether there are any means by which this threatened exclusion of British steel, iron, and machinery can be reduced to a reasonable proportion. It is all very well to say to foreign nations that we can sell them goods cheaper than they can themselves produce, but if they make up their minds and will become manufacturers "at any cost," then argument ceases to be of any avail, and unless we can show them a good set-off, either by a benefit or loss to them, in other way of trade for not meeting us, they will continue to adhere to their Protectionist ideas, and our markets become more and more curtailed."

ELECTRIC LIGHT IN THE CITY.—By the arrangement the Commission of Sewers has made with the various electric lighting companies interested, when the companies are in a position to pay 10 per cent. to the shareholders, a reduction will be made to private consumers. The Commissioners, we learn, expect that within twelve months the installation will be complete.—*City Press.*

INDUSTRIAL DEVELOPMENT AND TECHNICAL TEACHING IN THE WILDS OF DONEGAL.—A lecture on this subject, in aid of the funds of the Technical School of the Donegal Industrial Fund, and illustrated by dissolving views, will be given by Mrs. Ernest Hart, in Princes' Hall, Piccadilly, on Monday, January 19, at five p.m.

MESSRS. MATHESON & GRANT'S ENGINEERING TRADES' REPORT.—Messrs. Matheson & Grant, in their circular report dated the 1st inst., say, "The year just closed has been the most prosperous since 1873, for though in the autumn of 1879 there was a sudden revival and a rise in prices even greater than has lately prevailed, that revival was due to temporary causes and subsided early in the following year. The present activity has already lasted two years, it is still in operation, and, subject to certain contingencies, is likely to continue for some months to come. The Board of Trade Returns for the whole year show an improvement over 1889, although there is a diminution during the last few months. The engineering trades are particularly dependent on foreign enterprise, and when, in 1888, the accumulation of public works waiting to be done culminated in a general launching of such projects, ample capital was available for their accomplishment. South America, which has during the last few years played so important a part as a customer for the engineering manufactures of this country, is now an immediate cause of depression. The natural demands of the Argentine Republic, stimulated by bold financiers, have led to excessive borrowings, and engineers, together with the trades depending on them, who have benefited by the expenditure, are likely to feel most keenly the reaction now that the supply of money is arrested. Harbours and docks, waterworks on an unprecedented scale, mining projects, railways, electrical schemes, have all been equipped from Great Britain, and contracts for such supplies will be running for some months to come. The private Bills and provisional orders for the coming session, though much fewer in number than usual, will involve considerable expenditure among engineers and the trades dependent on them. Most of the principal railway companies are seeking powers for extensions, and in some cases for amalgamation with other lines. The proposal for a new route from the midland districts to London will be met with great opposition, and for the present is hardly likely to be authorised. The light railways already commenced in Ireland will open out new districts to further enterprise and development. Numerous schemes for canal and river improvement, giving cheap access from the inland towns to the sea, and even schemes for ship railways, are supported by capitalists.

NEW PARTNERSHIPS.—Mr. Percy Scott Worthington, M.A., who is an Associate member and medallist of the Institute of Architects, has joined the firm of Messrs. Worthington & Elgood, of Manchester, who will in future conduct their practice in conjunction with him, under the same style as before.——Mr. W. F. Miles, F.S.I., of the firm of Miles & Miles, Friar-lane, Leicester, announces that he has taken into partnership Mr. J. A. L. Beasley, who for a long time has been associated with the practice, having served his articles with the late Mr. E. L. Miles. The style of the firm will in future be "Miles & Beasley."

FAILURES IN THE BUILDING AND TIMBER TRADES.—According to *Kemp's Mercantile Gazette* there were last year 701 failures in the building and timber trades, as compared with 711 in 1889, 785 in 1888, 761 in 1887, and 712 in 1886.

THE ENGLISH IRON TRADE.—After longer holidays than usual—for business cannot be said to have commenced virtually before last Monday—the market opens the new year dull and weak. Nearly all the pig-iron markets this week were almost lifeless, the little trade that has been done being carried through only if lower prices than those current were accepted by makers. In Scotland the strike of the blast furnace-men and of the railway men combined, continues to paralyse business, while the warrant market has been extremely quiet. Very little has been done in Cleveland pig-iron, and similar accounts reach us from Lancashire and of the north-west of England. It is evident that transactions in finished iron and steel will not become more numerous until the quarterly meetings this week have shown what turn the market will take. Common bars are 5*s.* a ton lower, and shipbuilding material, both iron and steel, is also cheaper. Steel has receded from 2*s.* 6*d.* to 5*s.* a ton. The shipbuilding trade is very quiet as far as inquiries are concerned. Engineers open the year well on the whole, but there are signs of coming quietness in some branches.—*Iron.*

PROGRESS OF THE PLUMBERS' REGISTRATION MOVEMENT.—At the quarterly meeting of the Court of the Plumbers' Company, at the Guildhall, on the 29th ult., under the presidency of the Master (Mr. W. H. Bishop), Sir Philip Magnus brought forward a report showing that 1,350 apprentice and journeymen plumbers are now attending plumbing classes in London and the provinces, and that at examinations for the last session, held at Bristol, Edinburgh, Glasgow, Leeds, Liverpool, Manchester, and Newcastle-on-Tyne, the average number of "passes" was 44 per cent. of the total number of candidates. The Court had under consideration applications for aid in connexion with the plumbing classes at Plymouth and Dublin. The Court received a report of the presentation by the Mayor of Belfast of the Company's prizes to the successful students in the plumbing classes at Belfast.

DINNER TO BUILDING WORKMEN.—On New Year's Eve Lord Walsingham gave a dinner, at the King's Arms Inn, Watton, to the workmen, some 50 in number, employed by Mr. William Hubbard, of East Dereham, in building the new stables, &c., at Merton Hall, Norfolk. Mr. W. D. Hubbard presided, and the vice-chair was taken by Mr. Thwaites, the foreman of the works. After the usual loyal toasts, "The Health of Lord and Lady Walsingham" was proposed by Mr. Hubbard, and, of course, enthusiastically drunk. The architects of the new buildings (which replace those which were destroyed by fire in April last) are Messrs. Milne & Hall, of London.

THE ELECTRIC LIGHT AT DURHAM CATHEDRAL. A proposal has been made to light Durham Cathedral with electricity in future, instead of with gas, the motive power to be derived from the River Wear.

ROYAL SOCIETY OF ANTIQUARIES OF IRELAND.—The annual general meeting of this society will be held in the Lecture Theatre, Royal Dublin Society's House, Kildare-street, Dublin, on Tuesday next, January 13.

THE RECENT FIRE IN QUEEN VICTORIA-STREET.—Messrs. Thos. Thomas & Sons, hoisting engineers, announce that in consequence of the recent fire at 141, Queen Victoria-street, and pending the rebuilding of their late premises, they have taken offices temporarily at Metropolitan-buildings, 63, Queen Victoria-street.

MEETINGS.

MONDAY, JANUARY 12.

Royal Institute of British Architects. — Business Meeting for Members only. 8 p.m.

Liverpool Architectural Society.—Mr. T. Mellard Reade, the President, on "Slates and Slating." 7 p.m.

Leeds and Yorkshire Architectural Society. — Mr. Heywood Rider on "Decorative Art in its relation to Architecture." 7.30 p.m.

TUESDAY, JANUARY 13.

Institution of Civil Engineers.—Mr. W. H. Allen on "Auxiliary Engines in connexion with the Modern Marine-Engine." 8 p.m.

Society of Biblical Archæology.—Anniversary Meeting. 8 p.m.

Royal Society of Antiquaries of Ireland.—Annual General Meeting, Dublin. 4 p.m.

WEDNESDAY, JANUARY 14.

South Kensington Museum (Lecture Theatre).—Mr. Maurice Hewlett on "The Rise of the Renaissance in England." II. 3.45 p.m.

St. Paul's Ecclesiological Society.—Mr. E. J. Tarver, F.S.A., on "Screens." 8 p.m.

Society of Arts.—8 p.m.

Liverpool Engineering Society. — Annual Dinner, Adelphi Hotel, Liverpool. 7 p.m.

THURSDAY, JANUARY 15.

Institution of Electrical Engineers.—Inaugural Address by the President, Mr. W. Crookes, F.R.S. 8 p.m.

Society for the Encouragement of the Fine Arts.—Conversazione at the Galleries of the Institute of Painters in Water Colours, Piccadilly. 9 p.m.

Society of Antiquaries.—8.30 p.m.

Edinburgh Architectural Association. — Mr. H. Bellyse Baildon, M.A., on "Art Delight." 8 p.m.

Dundee Institute of Architecture.—Paper by Mr. Campbell Douglas, entitled "Some Architectural and other Notes on Portugal and Spain." 8 p.m.

FRIDAY, JANUARY 16.

Institution of Civil Engineers (Students' Meeting).—Mr. R. G. Hansford Worth on "A Survey of the Bed of Sutton Pool, Plymouth." 7.30 p.m.

RECENT PATENTS:

ABSTRACTS OF SPECIFICATIONS.

268.—BRICK-MAKING MACHINERY: *W. L. Gregg* (U.S.A.).—According to this specification, the improvements made by the patentee in the class of machinery or apparatus used in the manufacture of ornamental bricks consist chiefly in providing the machine with wheels to facilitate its movement from place to place; in providing the mould-box with a steel lining; and in an arrangement of springs and rods which operate the plunger.

9,637.—ROOFING TILES: *B. Edwards.*—According to this invention, on the weather face of each tile or slate where the overlapping tile reaches to one or more projecting bosses or short studs, the studs are so placed that the tile immediately above it is supported in such a manner that it is impossible for it to slip out of place or fall to the ground. Every tile when fixed on a roof has a twofold instead of a single means of support.

12,419.—DOOR BELLS: *A. F. Rockwell (U.S.A.).*—The objects of these improvements in door-bell mechanism are to provide for winding up the main-spring of a door-bell by the operation of opening the door, and at the same time provide for closing the door by a spring, connected with the door-casing at one end, and with a main-spring winding lever at the other end.

1,474.—FITTINGS FOR GATES AND HEAVY DOORS: *J. and T. Griffiths and J. James.*—To remedy the constant dropping of a gate, the upper hinge is made with a ratchet on one of its outer sides, and when the gate "sags," or drops, a notch is taken up. A peculiar fastening is also described, which will permit of the gate being easily opened by a man on horseback. The gates or doors are prevented from winding, and thus last much longer than those of ordinary make.

9,937.—LEAD PIPES: *L. W. Tracy and others.*—The principal feature in the manufacture of lead pipe, according to these improvements, is that the block is arranged directly at the end of a transversely-bored cylinder, thus dispensing with the ordinary die block.

16,765.—WOOD SCREWS: *C. D. Rogers.*—According to this patentee, the rolled screws, instead of having a gimlet point, are made with a plain point unthreaded, but provided with oppositely-arranged screw threads commencing at the base of the tip, extending radially, and forming chisel-shaped or cutting edges, the advantage being that in inserting the screw the unthreaded tip serves to first centre and steady or support the screw laterally, after which the sharp edges of the threads cut their way readily into the wood.

NEW APPLICATIONS FOR PATENTS.

December 22.—20,862, T. Newall and B. Ireland, Raising or Lowering Windows or Doors that work in Slides, at leisure, without the use of Pulleys, Weights, and Cords.

December 23.—20,908, J. Biggs and J. Allen, Flushing Cisterns, &c.—20,948, C. and O. Wernaer, Artificial Granite and Marble.—20,992, G. Jones, Electric Bells.

December 24.—21,021, H. Smart, Regulating Apparatus for Ventilating Shafts.—21,035, D. McKellar, Bench Stop.—21,041, E. Allen, Construction of Large Buildings for Exhibitions, Stores, Barracks, &c.

December 27.—21,072, E. Arthur, Glaze or Enamel for Tiles, Bricks, &c.—21,087, J. Sepulchre, Regulating the Draught of Fireplaces and Stoves.—21,120, J. Longworth, Closing, Latching, and Opening Doors.

December 29.—21,150, H. Haes, Levelling Staves.—21,159, J. Hancock, Chimney Cap and Ventilator.

December 30.—21,187, S. Burlingham, Machinery for Pressing Bricks, Tiles, &c.—21,191, E. Allen, Construction of Portable Buildings and Fixing same.—21,192, E. Allen, Concrete Buildings, &c.—21,210, A. Boult, Carving or Cutting Machines.

December 31.—21,265. J. Houston and J. Colville, Automatic Smoke Cowl.—21,275, J. McGlashan, Preventing Down-draught in Chimneys, Ventilators, &c.—21,278, E. Nutzinger, Asphalte Pavements and Coverings.

PROVISIONAL SPECIFICATIONS ACCEPTED.

17,839, J. Machale, Anti-fouling Paint and Preservative Composition.—17,902, J. Leather, Ventilating.—19,213, R. Batey, Norfolk and Suffolk Latches, &c.—19,836, J. Beddow, Reversible Locks and Latches for doors and gates.—20,477, P. Lawrence, Producing Ornamental Effects or Designs in Wood, &c.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

579, W. Reynor, Staunching Defective House-drains without taking up floors or opening ground in basement.—2,941, G. Appiani, Kiln.—6,237, T. Jones, Dispensing with the use of Sash Lines and the ordinary Sash Fastener.—11,346, R. Curry and others, Joining Water, Gas, and other Pipes.—18,459, C. Haensler, Fire and Weather Proof Roofing.—19,141, W. Thompson, Door Hinges.—19,154, J. Bardsley, Door Spring and Check.—19,192, G. Spring, Sash Holders.

SUMMARY OF SALES AT THE MART IN 1890.

THE return of sales of real estate, &c., as recently reported by the Estate Exchange for the year ending the 31st ult., is 4,287,111*l.*, as compared with 4,304,954*l.* for the year 1889, thus showing a decrease of 17,843*l.*, and also a falling off as regards the year 1888, when the amount registered was 4,447,840*l.*

We have carefully analysed the reports as published in the columns of this paper each week, and find that the properties sold during the past year were divided and realised as under:—

	£.
1,188 Freehold houses in the London Postal Districts	700,510
52 Copyhold ditto ditto	30,010
3,398 Leasehold ditto ditto	1,101,345
533 Freehold houses outside the Postal Districts	227,108
30 Copyhold ditto ditto	24,770
144 Leasehold ditto ditto	45,318
Freehold ground-rents of 9,476*l.* 9s. 8d. in the Postal Districts	283,096
Copyhold ditto 90*l.* 0s. 0d. ditto	1,800
Leasehold ditto 7,604*l.* 13s. 6d.	110,997
Freehold ditto 2,785*l.* 16s. 6d. outside the Postal Districts	79,560
Leasehold ditto 162*l.* 1s. 8d. ditto	2,140
Enclosures of freehold land 29,512a. 2r. 25p.	1,202,740
Enclosures of copyhold land 427a. 2r. 27p.	29,070
Freehold building sites, with areas of 110,204 sup. ft.	27,115
220 freehold building plots	28,096
Three copyhold building plots	155
One brewery	20,000
53 public and beer houses	73,080
One music-hall	27,100
Freehold and leasehold wharves	12,400
Foreign estates of 13,026 acres	20,315
Reversions	33,146
Shares	169,505
Policies for 31,887*l.* 15s.	16,627
Rent charges, chief rents, and fee-farm rents of 655*l.* 6s. 1d.	16,483
Advowsons	1,330
Annuities	550
Goodwill and plant	90
Box in the Albert Hall	175
Fishing rights	1,680
Spring of water	800
Total	£4,287,111

Referring to the statistics for the year 1889, as published in our columns on January 11 last, we find that there is a falling off in 1890 in the amount realised for both freehold houses and ground-rents, but an increase is shown on the sale of similar properties of leasehold tenure; landed property also showing an improvement, although the average is not so high as in 1890, when land averaged over 50*l.* per acre, as compared with about 41*l.* per acre for the past year.

There has also been a falling off in the letting of building sites, as only 10,339 superficial feet were let by auction, realising 2,412*l.* per annum.—*Estates Gazette.*

PRICES CURRENT OF MATERIALS.

TIMBER.	£. s. d.	£. s. d.
Greenheart, B.G. ....ton	6 15 0	7 5 0
Teak, E.I. ....load	10 0 0	13 0 0
Sequoia, U.S. ....foot cube	0 2 3	0 3 0
Ash, Canada ....load	2 10 0	4 5 0
Birch ,, ...	2 5 0	4 5 0
Elm ,, ...	3 10 0	4 15 0
Fir, Dantsic, &c.	2 0 0	3 15 0
Oak ,, ...	2 10 0	4 10 0
Canada	4 17 6	6 10 0
Pine, Canada red	2 10 0	3 10 0
,, yellow	2 0 0	5 10 0
Lath, Dantsic ....fathom	5 0 0	6 0 0
St. Petersburg	5 0 0	7 0 0
Deals, Finland, 2nd & 1st. std. 100	7 10 0	10 0 0
,, ,, 4th and 3rd	7 0 0	7 5 0
Riga	6 0 0	8 0 0
St. Petersburg, 1st yellow	9 10 0	14 10 0
,, 2nd ,, ...	7 10 0	9 0 0
,, white	7 0 0	10 0 0
Swedish	7 0 0	15 10 0
White Sea	8 0 0	17 0 0
Canada, Pine, 1st	13 0 0	24 0 0
,, ,, 2nd	9 0 0	16 0 0
,, ,, 3rd, &c.	7 0 0	10 0 0
,, Spruce, 1st	8 10 0	10 10 0
,, ,, 3rd and 2nd ..	6 10 0	8 0 0
New Brunswick, &c.	5 10 0	7 10 0
Battens, all kinds	4 10 0	15 10 0
Flooring Boards, sq., 1 in., prepared, First	0 10 0	0 14 0
Second	0 8 0	0 10 6
Other qualities	0 5 6	0 7 9

TIMBER (*continued*).	£. s. d.	£. s. d.
Cedar, Cuba ....foot	0 0 4	0 0 5
Honduras, &c.	0 0 3½	0 0 4½
Mahogany, Cuba	0 0 4½	0 0 6½
St. Domingo, cargo average ..	0 0 4½	0 0 6½
Mexican ,, ...	0 0 4½	0 0 5½
Tobasco ,, ...	0 0 5½	0 0 6½
Honduras ,, ...	0 0 5½	0 0 6½
Box, Turkey ....ton	4 0 0	13 0 0
Rose, Rio	12 0 0	19 0 0
Bahia	10 0 0	18 0 0
Satin, St. Domingo ....foot	0 0 9	0 1 3
Porto Rico	0 0 10	0 1 6
Walnut, Italian	0 0 4	0 0 7
METALS.		
IRON—Bar, Welsh, in London tn	6 10 0	6 17 6
,, ,, at works in Wales	6 0 0	6 10 0
,, Staffordshire, in London ..	7 0 0	8 0 0
COPPER—British, cake and ingot	57 0 0	58 0 0
Best selected	59 0 0	60 0 0
Sheets, strong	66 0 0	0 0 0
Chili, bars	53 0 0	0 0 0
YELLOW METAL ....lb.	0 0 6¾	0 0 6¾
LEAD—Pig, Spanish ....ton	12 17 6	13 0 0
English, com. brands	13 2 6	13 5 0
Sheet, English, 3 lbs. per square foot and upwards	15 0 0	15 5 0
Pipe	16 10 0	0 0 0
ZINC—English sheet ....ton	27 0 0	27 10 0
TIN—Straits	90 15 0	0 0 0
Australian	90 15 0	0 0 0
English Ingots	0 0 0	0 0 0
OILS.		
Linseed ....ton	21 10 0	21 17 6
Cocoanut, Cochin	33 10 0	34 0 0
Ceylon	29 0 0	0 0 0
Palm, Lagos	26 0 0	26 10 0
Rapeseed, English pale	28 5 0	0 0 0
,, brown	26 15 0	0 0 0
Cottonseed, refined	18 0 0	18 5 0
Tallow and Oleine	21 0 0	40 0 0
Lubricating, U.S.	6 0 0	7 0 0
,, refined	7 10 0	12 0 0
TAR—Stockholm ....barrel	1 1 0	0 0 0
Archangel	0 14 0	0 0 0

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *noon on Thursdays.*]

BERE REGIS.—For the erection of a pair of labourers' cottages, at Bere Regis, Dorset, for Mrs. S. C. E. E. Erle-Drax. Mr. W. Watts Fookes, architect and surveyor, Wareham:—

Green	£410	Beer, Wareham*	£345
Hobbs	374	* Accepted.	

BOURNEMOUTH.—For pipes, &c., for sea-water scheme extension for the Corporation of Bournemouth. Mr. F. W. Lacey, Borough Engineer. Quantities supplied by the Engineer:—

E. Howell	£4,064 10 8	J. & S. Roberts, Ld.	£2,552 6 5
Staveley Coal and Iron Co.	2,705 12 0	The Stanton Ironworks Co., Nottingham (accepted)	2,436 10 2
Cochrane, Grove, & Co.	2,701 15 8	Clay Cross & Co., Limited (informal).	
Dorset Iron Foundry Co.	2,626 2 3	Cochrane & Co., Limited (informal).	
Wood & Co.	2,592 16 4		

For Sluice Valves, &c.

Staveley Coal and Iron Co.	£308 14 0	F. Bird & Co.	£206 2 0
E. Howell	267 9 0	Stanton Ironworks Co.	205 7 0
Dorset Iron Foundry Co.	239 6 0	Glenfield Co., Ltd.	196 19 0
Beck & Co.	229 12 8	J. Stone & Co.	185 15 6
Wood & Co.	218 6 4	Blakeborough & Sons, Brighouse (accepted)	159 11 0

For the Supply of Pipes, &c., Alum Chine Outfall.

Staveley Coal and Iron Co.	£1,445 12 6	Stanton Ironworks Co.	£1,040 13
E. Howell	1,308 18 10	Jas. Oakes & Co. London, (accepted)	923 11 11
Firmstone Bros.	1,158 6 0	Cochrane & Co. (informal).	
Cochrane, Grove, & Co.	1,102 2 11	Clay Cross Co. (informal).	
Wood & Co.	1,061 3 1		
J. & L. Roberts, Ld.	1,052 1 2		

BOURNEMOUTH.—For carrying out alterations and erecting new buildings at West Yard, for the Bournemouth Town Council. Mr. F. W. Lacey, Surveyor, Town Hall-chambers, Bournemouth:—

Reed, Blight, & Co.	£1,964 0	Hayward, Penton, & Co.	£1,298 12
F. Hoare & Son	1,490 0	J. W. Lucas, Bournemouth (accepted)	1,298 0
Jos. White	1,410 0		

BRISTOL.—For the erection of a villa residence at Mount's Hill, Kingswood. Messrs. Cloutman & Smith, surveyors, Somerset-chambers, Corn-street, Bristol. Quantities by the surveyors:—

S. Turner	£830	C. & F. Iles	£610
S. Williams	625	W. Godfrey, Kingswood*	592
T. T. Smith	612	J. & C. Wiltshire	580
		* Accepted.	

CHESHAM.—For the erection of two villa residences on the Stanley-avenue Estate, Chesham, Bucks. Mr. Geo. H. Green, architect and surveyor, Chesham:—

W. Freeman, Chesham (accepted) £1,200 0 0

CHESHAM.—For the construction of new road, kerbing, channelling, sewering, and other works on the Stanley-avenue Estate, Chesham, Bucks. Mr. Geo. H. Green, surveyor, Chesham:—

Geo. Capper	£725	J. Morecroft, Windsor*	£680
A. Mead	700	* Accepted.	

CWMBRAN.—For road-making, building chapel, caretaker's house, entrance-gate, and boundary walls at the Cemetery, for the Llantarnam Local Board. Mr. B. Lawrence, architect, Austin Friars'-chambers. Quantities by Mr. C. Miles, Newport, Mon.:—

J. Jones Dawes	£1,838 0 0		
J. Jenkins, Clifton-road, Newport*	1,689 0 0		
*Accepted for buildings and roads.			

GREENWICH.—For alterations to Blue Coat School, Greenwich, S.E. Mr. Thomas Dinwiddy, architect, Greenwich:—

Holding	£245	Kennard Bros.*	£209
Leng	216	* Accepted.	

HARROW.—For building house at Harrow, for Mr. E. Wintle, of Weymouth-street, W.:—

Alaway Bros. (accepted) £350 0 0

LEICESTER.—For alterations and additions to Messrs. J. Mason & Co.'s Stone-crushing Engineering Works, Brandon-street, Leicester. Mr. H. Stockton Judd, architect and surveyor, 8, New-street, Leicester. Quantities by the architect:—

Bricklayers, &c.

T. Johnson	£343 0 0	W. G. Harrison	£287 15 8
Duxbury & Son	339 0 0	A. Plant	285 0 0
T. C Tyers	317 0 0	T. Bland & Sons	285 0 0
B. Leak	314 10 0	T. R. Tebbatt*	283 0 0
C. E. Richardson	300 0 0	* Accepted.	

LEICESTER.—For alterations to premises in High-street, Leicester, for Messrs. Foster Brothers. Mr. H. Stockton Judd, architect and surveyor, 8, New-street, Leicester. Quantities by the architect:—

Bricklayers, &c.

T. & H. Herbert	£410 0	T. C. Tyers	£270 0
Duxbury & Son	339 0	C. E Richardson	264 15
T. Bland & Son	289 15	A. Plant*	264 0
T. R. Tebbatt	270 0	* Accepted.	

Ironfounders.

Ashwell & Co	£234 0	Goodwin, Barsby & Co	£205 0
W. W. Judd	219 19	Gimson & Co. (accepted)	205 0

Plumbers.

Norman & Underwood £171 14 0

LISCARD (Birkenhead).—For the erection of an ornamental boundary fence and entrance gates for new park, for the Wallasey Local Board. Mr. A. Salmon, Surveyor to the Board, Public-offices, Egremont, Cheshire:—

J. W. Wilson, New Brighton (accepted) £4,490 0 0

LIVERPOOL.—For new stables, &c., Cropper-street, for Messrs. Lewis's, Ranelagh-street. Mr. Walter W. Thomas, architect, 25, Lord-street, Liverpool:—

Morrison & Sons	£2,435	J. & G. Chappell	£1,997
Hughes & Sterling	2,280	James Sanders	1,975
W. Thornton & Sons	2,185	W. Tomkinson & Sons	1,969
Roberts & Robinson	2,100	James Holme	1,963
Samuel Webster	2,020	Isaac Dilworth	1,910
J. Henshaw & Sons	1,999		

LONDON.—For the erection of a new Police Station at Barnes, for the Receiver for the Metropolitan Police District. Mr. John Butler, Architect. Quantities by Mr. W. H. Thurgood:—

Aviss	£4,590	Patman & Fotheringham	£4,396
Thompson	4,586	J. T. Chappell	4,390
Higgs & Hill	4,494	J. & J. Greenwood	4,347
Colls	4,450	Ansell	4,300
Garlick & Horton	4,430	Smith & Sons	4,293
Grover & Son	4,417	Scrivener	4,256
Nightingale	4,410	Adamson	4,195
Hart	4,397	Lathey Bros.	4,047

LONDON.—For alterations and repairs to No. 1, Macclesfield-street Soho, for Mr. G. Hart. Mr. H. Wakeford, architect, 15, Stockwell-road, S.W.:—

Rice & Son	£1,101 0 0	W. Watson*	£1,079 0 0
Lathey Bros.	1,087 0 0	* Accepted.	

LONDON.—For alterations and additions at "The Princess of Wales," York-road, Wandsworth, for Mr. H. Dearling. Mr. G. Treacher, architect. Quantities not supplied:—

B. Stone	£1,815 0 0	Moore & Son	£1,347 0 0
Burman & Son	1,500 0 0	J. Beale	1,340 0 0
Hensell	1,414 0 0	S. & L. W. Ransom	1,275 0 0

LONDON.—For the erection of All Saints' Vicarage, Kensington-park, for the Rev. Canon Trench. Mr. E. P. Loftus Brock, F.S.A., architect:—

B. Colley & Sons	£3,325 0 0	Mattock Bros.	£2,877 0 0
B. E. Nightingale	3,250 0 0	Puzey & Lumley	2,780 0 0
J. C Tennant & Co.	3,069 0 0	J. Allen & Sons	2,675 0 0
W. Johnson	2,944 0 0	P. Peters (late)	2,655 0 0

LONDON.—For rebuilding stabling, and alterations to leather factory and warehouse, at Rudford-road, Rotherhithe, S.E. Mr. Fred. G. Grierson, architect, 9, Old Jewry-chambers, Cheapside, E.C.:—

J. Pocock	£983	Matlock Bros.	£833
H. H. Hollingsworth	888	Courtney & Fairbairn*	745
C. Ansell	882	* Accepted.	

Constructional Ironwork.
Rownson, Drew, & Co. (accepted).
[No competition.]

LONDON.—For the rebuilding of the printing works of Messrs. Ford, Shapland, & Co., Nos. 26 and 27, Whetstone-park, Lincoln's-inn-fields. Mr. H. Huntly-Gordon, architect, 123, Cannon-street, E.C.:—

Perry & Co.	£1,954	Wm. Shurmur	£1,746
F. & H. F. Higgs	1,850	E Jones	1,738
Wm. Brass	1,806	E. Laurence & Son	1,652
Falkner	1,804	W. & F. Croaker*	1,632
D. Charteris	1,752	* Accepted.	

LONDON.—For the re-building of No. 13, Bateman-street, Soho, and forming weekly tenements and shop premises. Mr. H. Huntly-Gordon, 123, Cannon-street, E.C., architect:—

E. Jones	£1,589	W. Shurmur	£1,395
J. W. Falkner	1,489	Kirby & Chase	1,350
F. & H. F. Higgs	1,480	Wm. Scrivener & Co.	1,336
D. Charteris	1,427	W. & F. Croaker*	1,243
E. Lawrence & Sons	1,400	* Accepted.	

MOLD (North Wales).—For taking out old plant and machinery and refitting with new, and alterations to Brewery, High-street, Mold, for Messrs. D. C. Radcliffe & Co. Mr. Walter W. Thomas, architect, 25, Lord-street, Liverpool:—

Ellis Marsden, Liverpool £1,110 0 0

SUTTON-IN-ASHFIELD.—For providing temporary pumping plant and executing certain works to augment the water-supply by one million gallons per day, for the Local Board. Mr. Geo. Hodson, engineer, Abbey-buildings, Westminster, London, S.W.:—

Docwra & Son	£6,411 0 0	H. Bowman	£2,299 1 7½
Tilley & Sons	2,832 1 8	Price & Shardlow	2,034 0 0
Fotherby & Son	2,502 10 0	H. Vickers, Nottingham (accepted)	1,950 0 0
J. Tomlinson	2,475 0 0		

WALLASEY.—For sewering and making promenade, with other relative works, for the Wallasey Local Board. Mr. A. Salmon, Surveyor, Public Offices, Egremont, Cheshire:—

A. Bleakley, Birkenhead (accepted) £6,307 18 4

WARLINGHAM.—For the erection of a new country house at Westhall, Surrey, for Mr. James Linsay Travers. Mr. H. Huntley-Gordon, architect, 123, Cannon-street, E.C.:—

T. & J. Ward, Warlingham £1,750 0 0

[No competition.]

WARLINGHAM.—For the erection of stabling and gardener's cottage at Westhall, Surrey. Mr. H. Huntly-Gordon, architect, 123, Cannon-street, E.C.:—

T. & J. Ward ..... £750 | Charles Rice, East Grinstead £625

WEST BURTON.—For building a covered service reservoir to hold about 6,250 gallons, and for the construction of an earthenware conduit about 550 yards in length, and cast-iron pipes, for the Aysgarth Union Rural Sanitary Authority. Messrs. Rodwell & Son, engineers, Keld Head Office, Wensley, Yorks:—

Thos. Armstrong & Chris. Bushby, West Witton and Preston (accepted) £414

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"A Competitor" (should have enclosed name and address. We cannot act upon anonymous communications).—W. S. (of course no such ceiling would be passed by a District Surveyor in the case of a public building. The degree of danger depends on the construction of the floor above. If this is a solid fire-proof floor of brick or concrete, the danger in case of fire is not so great; if it is a timber floor, with ordinary boarding, the whole may be said to be a preparation for a bonfire).—F. W. R. (should have sent amounts).—J. D. (ditto).—Messrs. B. (ditto).—J. H. (ditto).—F. M. & Co. (too late for this week).—C. L. & Co. (ditto).—J. H. (too late).—B. G. & S. Co. (ditto).

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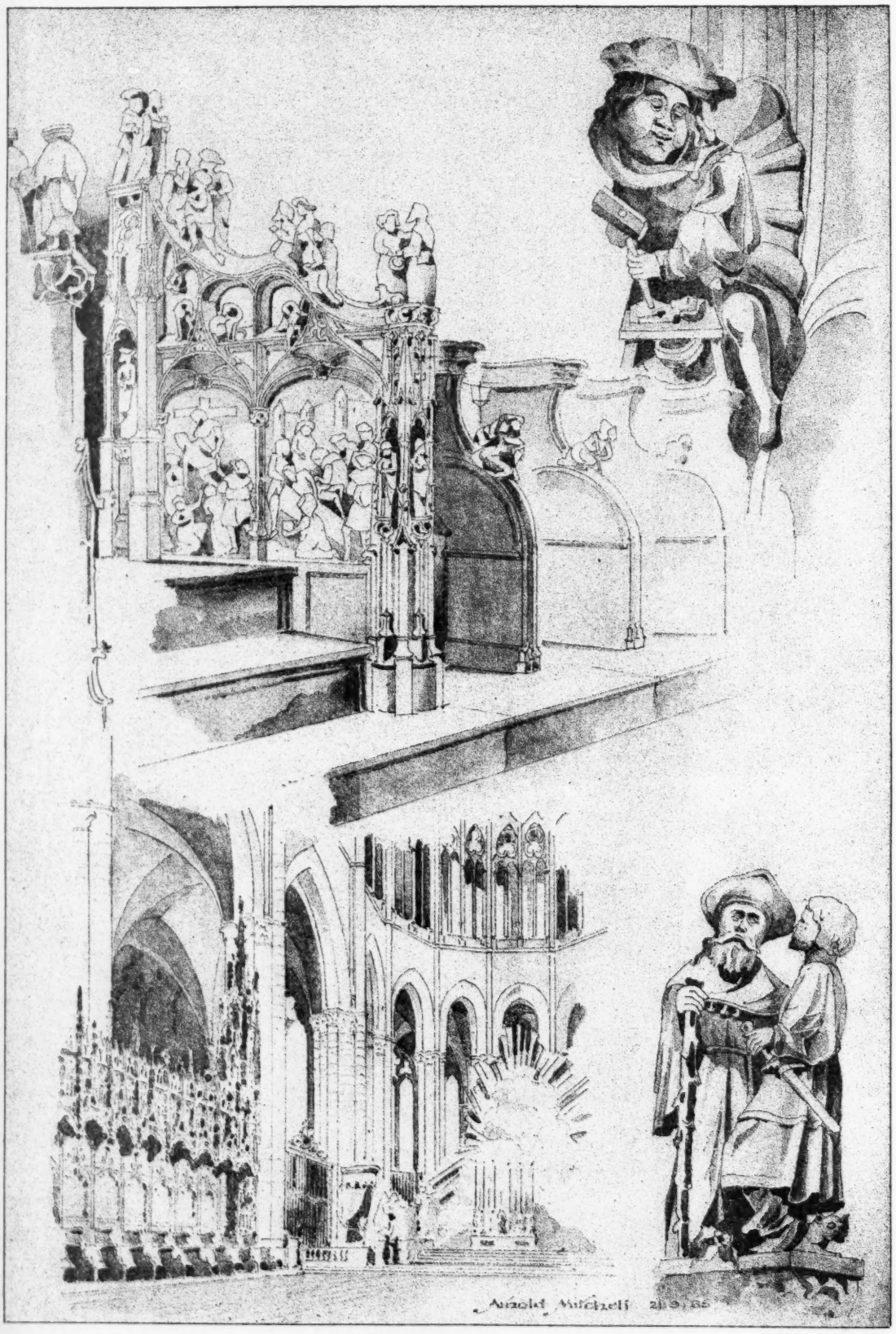

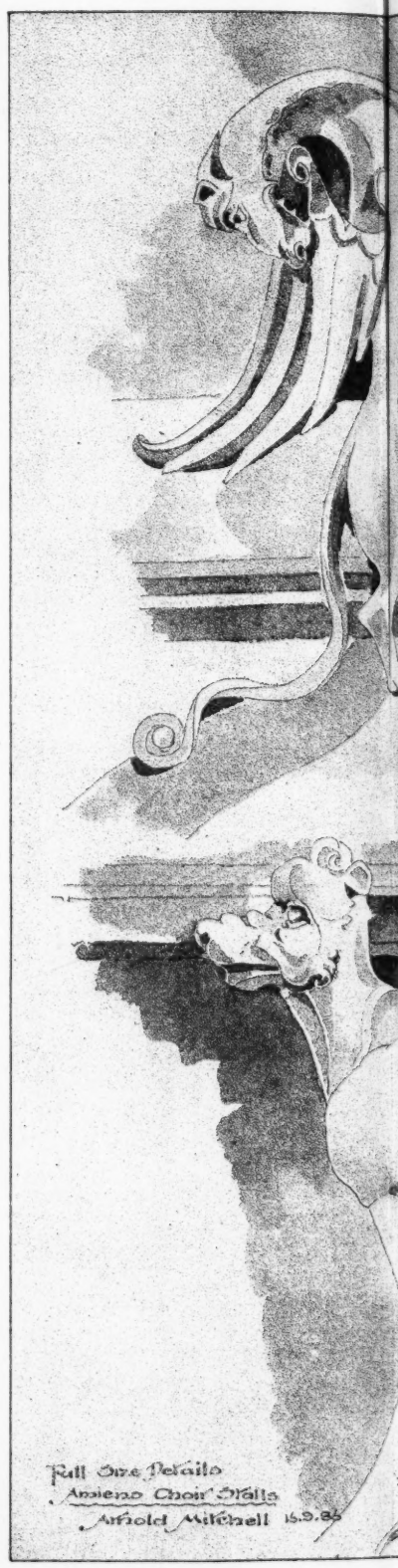

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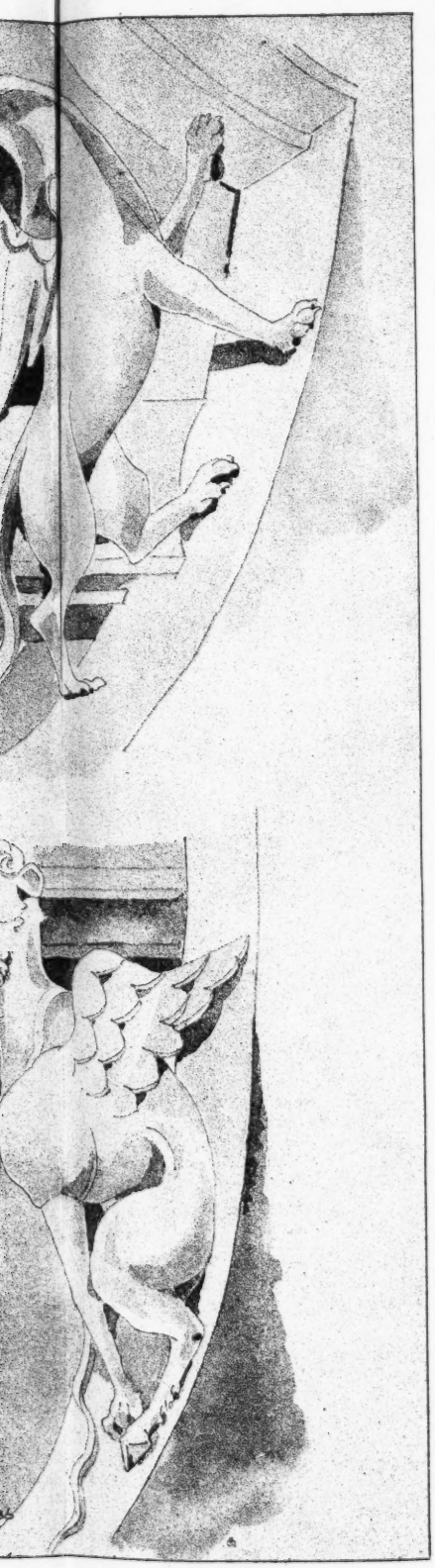

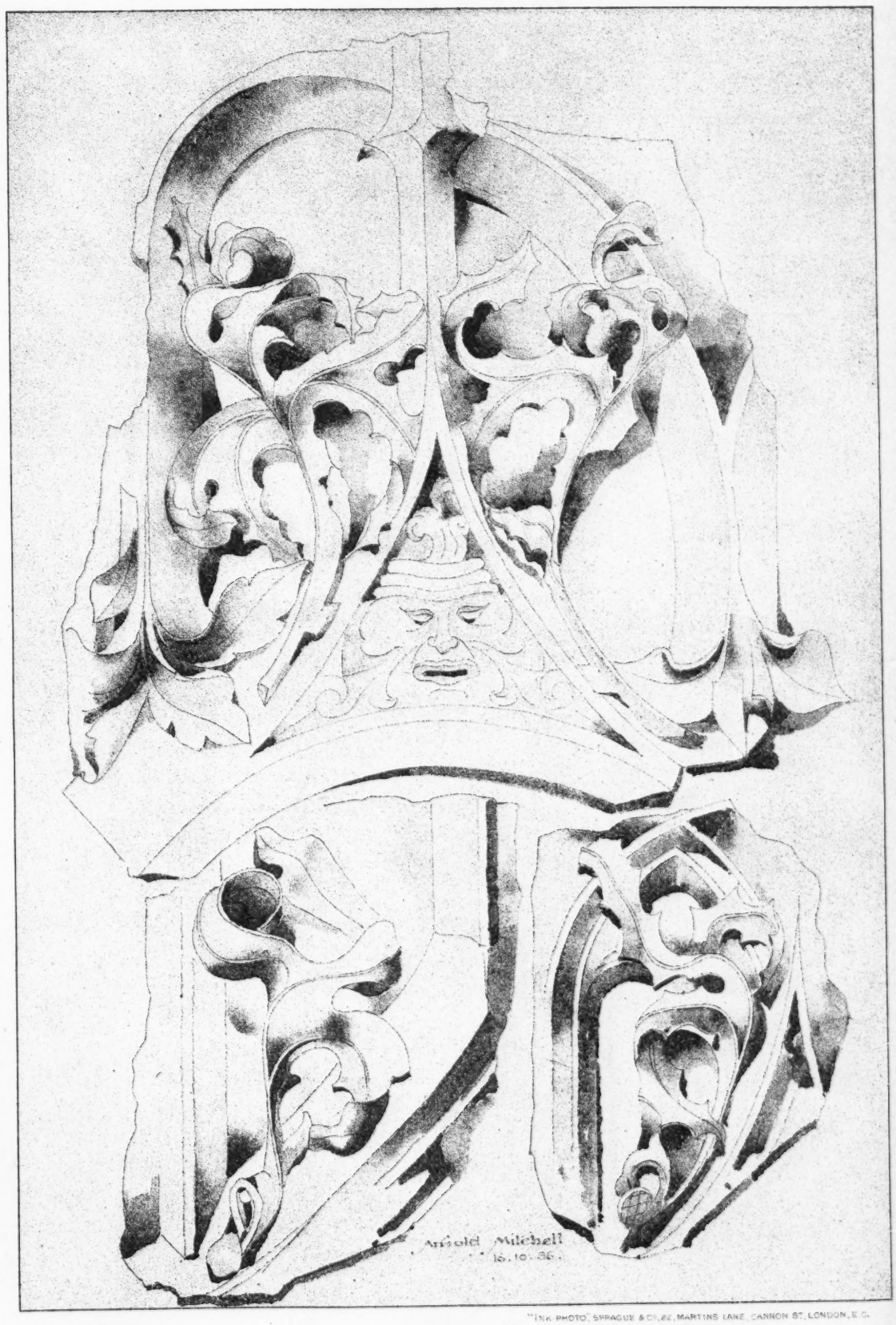

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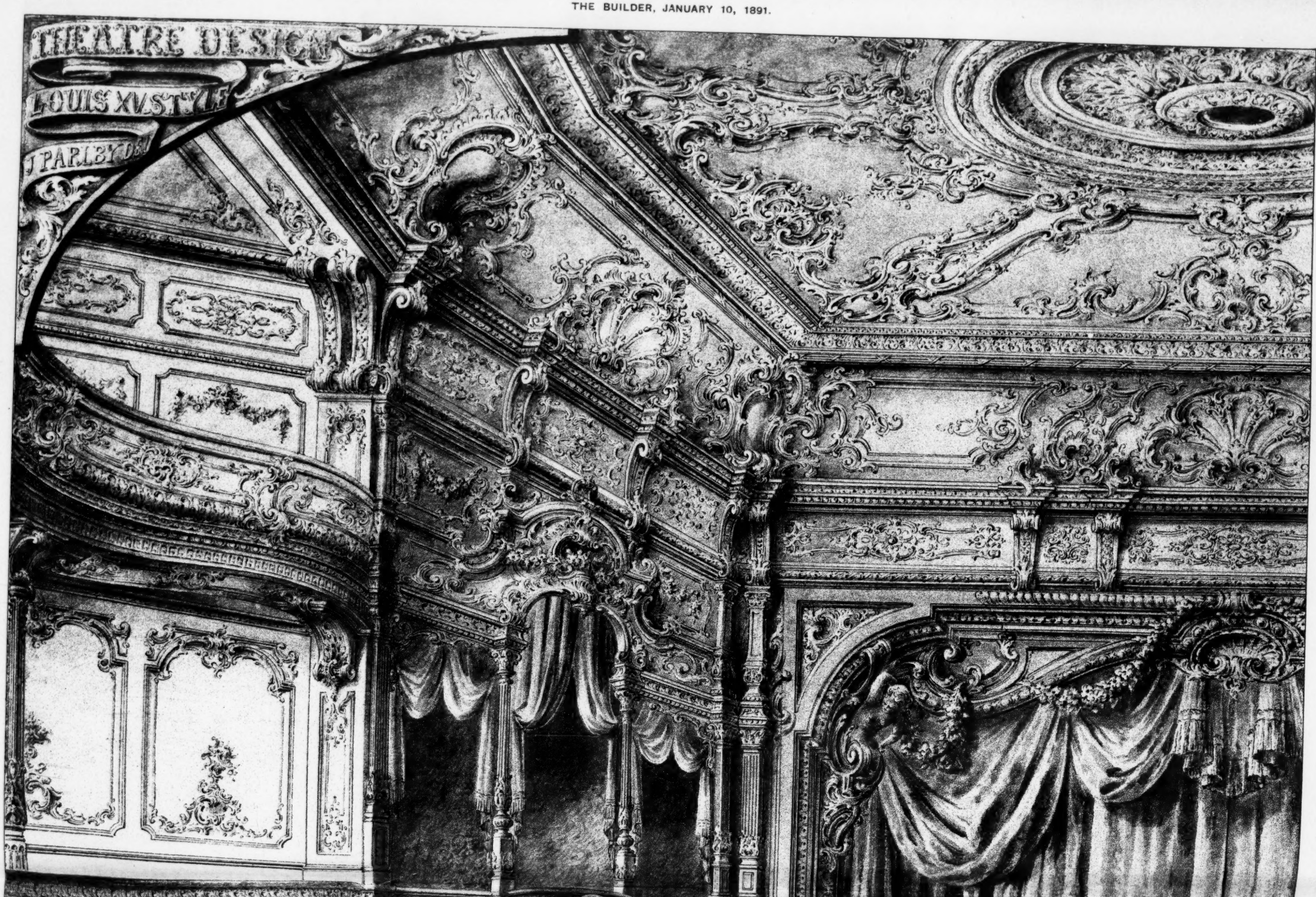
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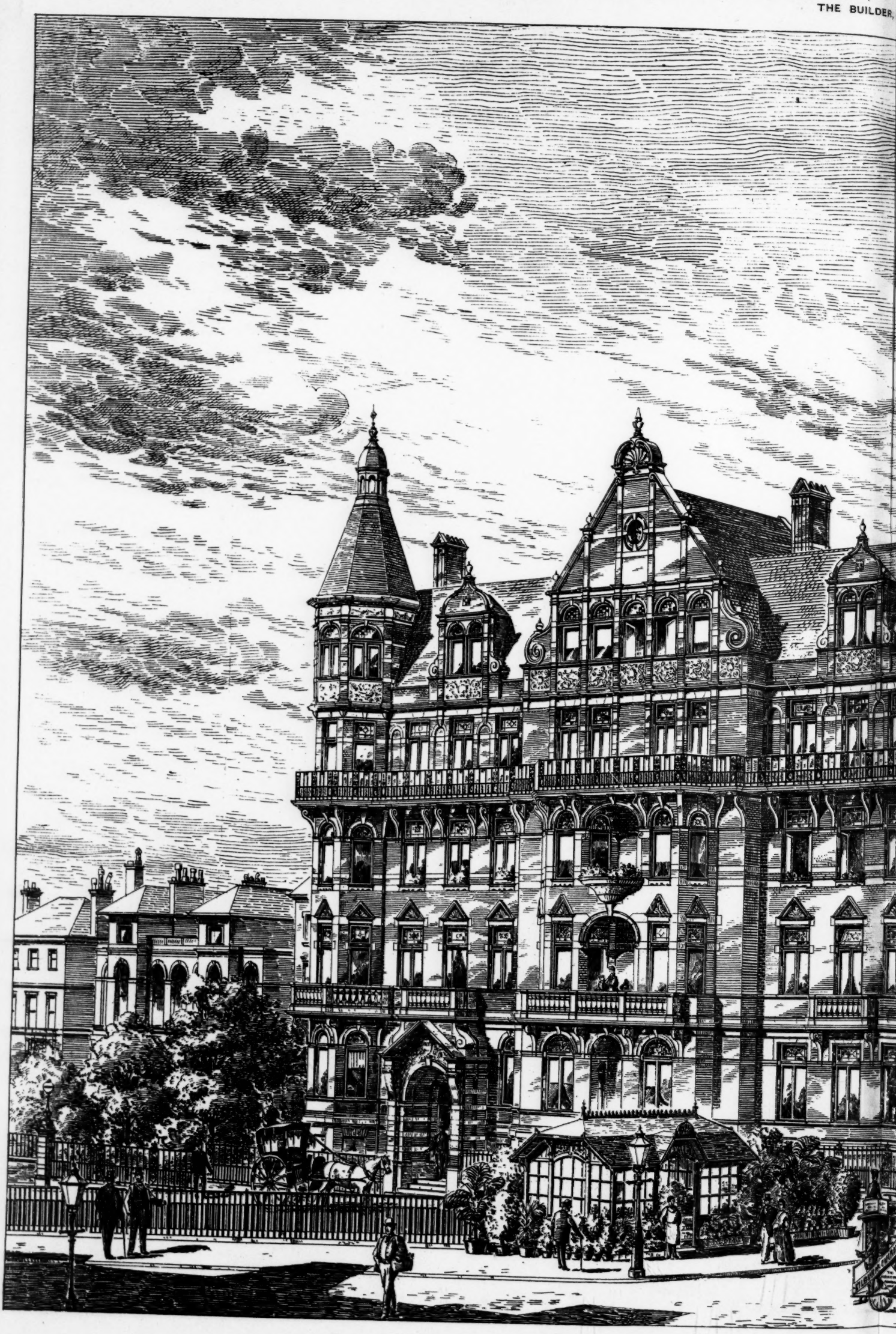

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